

REPORT
OF
The Electricity Tariff Advisory Committee
ON
Tariffs for the Supply of Power
FROM
The Bhakra-Nangal and Uhl River Projects



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1954

PUNJAB CIVIL SECRETARIAT,
SIMLA-2,
July 10, 1953.

FROM

THE CHAIRMAN AND MEMBERS OF THE TARIFF
ADVISORY COMMITTEE

To

- (1) THE SECRETARY, ELECTRICITY BRANCH, P.W.D.,
PUNJAB, GORTON CASTLE, SIMLA—(140 CCPIIS).
- (2) THE SECRETARY, ELECTRICITY, P.W.D., PATIALA—
(20 COPIES).
- (3) THE CHIEF ENGINEER, ELECTRICAL AND MECHANICAL
DEPARTMENT, RAJASTHAN (JAIPUR)—
(20 COPIES).
- (4) THE SECRETARY, BHAKRA CONTROL BOARD,
CURZON ROAD, NEW DELHI—(20 COPIES).

DEAR SIR,

WE forward herewith the Report of the Tariff Advisory Committee, which has our unanimous approval.

2. When this report was at an advanced stage of drafting, information was received from the Uttar Pradesh Government that they are not interested in purchasing power from the Bhakra-Nangal Project. The report assumes a load on their behalf. We have not considered it worthwhile to amend the figures of the report in so far as they are dependent on supplies to Uttar Pradesh, because it would have involved considerable detailed work.

3. We consider it most important that decisions by the State Governments should be made and announced speedily in regard to tariffs. There are already several enquiries pending regarding rates of supply, and it is in the interests of rapid load development to let consumers know exactly how they stand. We, therefore, venture to suggest the following programme and procedure for considering this report :—

- (1) As several important recommendations apply equally to three State Governments, it is suggested that the existing forum of the Bhakra Control Board should be utilized for coming to joint conclusions.
- (2) The report, we hope, will be available to State Governments by the end of July, 1953. The State Governments should consider it speedily, and send their comments to the Bhakra Control Board by the end of August, 1953.
- (3) The Bhakra Control Board should consider the State Governments' comments, and render their advice to them by the middle of October, 1953. It is hoped that, at this stage, the conclusions of the Bhakra Control Board will be final. This should be possible, if the representatives of the State Governments on the Board are instructed to come to the Board meeting at an adequate level to make final decisions on behalf of their Governments.

- (4) If this plan works out, it should be possible to announce tariffs by the end of October, 1953.

Yours faithfully,

Chairman—

E. N. MANGAT RAI,
Finance Secretary, Punjab.

Members—

K. P. P. MENON,
Utilization Member, C.W.P.C.

S. S. KUMAR,
Chief Engineer and Secretary, Electricity, Punjab.

L. K. SEHGAL, Assistant Director of Industries,
for J. S. BASUR,
Director of Industries, Punjab.

PRITAM SINGH, Assistant Director of Agriculture,
for H. R. SAINI,
Director of Agriculture, Punjab.

PRITHVI SINGH, Executive Engineer, Projects.
for C. PADMANABHAN,
Chief Engineer, Electrical and Mechanical, Rajasthan.

J. S. JAIJEE,
Superintending Engineer, Electrical and Mechanical, Pepsu.

MELA RAM SOOD,
Punjab Licensees Association.

JANKI DAS KAPUR,
Punjab Chamber of Commerce.
(Did not sign the report as he was unable to attend the last meeting).

JASWANT SINGH BHAGAT,
Indian Chamber of Commerce.

AMRIT LAL,
Director of Industries, Pepsu.

Alternate Member—

S. SWAYAMBU,
Senior Project Officer, C.W.P.C.

Member Secretary—

M. L. GHAI,
Sales Engineer, Electricity, Punjab.

Technical Sub-Committee—

S. SWAYAMBU,
Senior Project Officer, C.W.P.C.

B. C. SOOD,
Tariff Officer, Electricity, Punjab.

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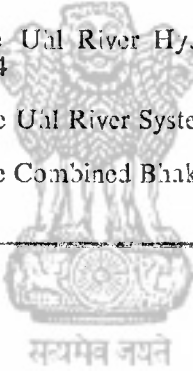
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INTRODUCTION

1. This Committee was set up by Punjab Government,—*vide* Gazette Notification No. 647/51/EG-159, dated 22nd November 1951, which is reproduced below :—

Terms of Reference and Composition of the Committee.

"1. Functions or Terms of Reference—

- (1) To review the existing tariffs applicable to all classes of consumers served by the Uhl River Hydro-Electric Scheme and to suggest such modifications therein as may be considered necessary subject to item (3) below.
- (2) To formulate a set of tariffs for all classes of consumers in the areas to be served by the Nangal-Bhakra Hydel Project subject to item (3) below.
- (3) To examine the anticipated financial results of the Uhl River and Nangal Projects as one integrated system and to assess if a composite set of tariffs could be adopted in preference to separate tariffs as in items (1) and (2) above. If this is considered feasible, the Committee should recommend suitable tariffs for the combined system and also indicate the ways and means for adopting these tariffs.

2. The following will be the members of the above Committee :—

Chairman

- (1) Secretary to Government, Punjab, Finance Department.

Members

- (2) Representative of the Central Water and Power Commission (Power Wing), Dr. K. P. P. Menon or Mr. Swayambu as an alternate member.
- (3) Chief Engineer and Secretary to Government, Punjab, P.W.D., Electricity Branch.
- (4) Director of Industries, Punjab (I).
- (5) Director of Agriculture, Punjab (I).
- (6) Representative of the Rajasthan Government.
- (7) Representative of the Pepsu Government.
- (8) Representative of the Punjab Licensees Association.
- (9) Representative of the Punjab and Delhi Chamber of Commerce or its equivalent organisation.
- (10) Under-Secretary of the Punjab Public Works Department, Electricity Branch, or equivalent, who would be *ex-officio* Secretary of the Committee.

3. The Headquarters of the Committee will be at Simla.

4. The Punjab State Government will have powers to appoint from time to time such individuals as may be considered necessary to help in the examination of the particular problems which may come before the Committee.

5. The Punjab State Government shall have powers to remove a member of the Committee at any time.

6. The Secretary of the Committee will convene meetings in consultation with the Chairman of the Committee and will give due notice to the members of the place and date of each meeting.

7. The Committee will submit their Report within 6 months from the date of this Notification .

8. The terms of the membership of the representation of—

(i) Central Water and Power Commission (Power Wing),

(ii) the Punjab Licensees Association, and

(iii) the Punjab Chamber of Commerce,

will be notified later on.”

Note No. 1—Subsequently, the following additions were made to the Committee :—

(i) The Director of Industries, Pepsu.

(ii) A representative of the Indian Chamber of Commerce.

Note No. 2—The Sales Engineer of the Punjab P.W.D., Electricity Branch, was appointed Secretary to the Committee.

2. Three meetings were held at all of which Shri E. N. Mangat Rai, Finance Secretary to the Government of Punjab, presided. In addition to Dr. K. P. P. Menon, Member, C. W. and P. C., Shri S. Swayambu attended all the meetings by invitation and worked as a member of the Technical Sub-Committee. Shri S. S. Kumar, Chief Engineer, P. W. D., Electricity Branch, Punjab (I), attended the second and third meetings and in his absence, the first meeting was attended by Shri H. B. Gupta of the Punjab Electricity Department. S. Kartar Singh, Shri D. D. Suri and S. Pritam Singh represented the Director of Agriculture, Punjab, at the first, second and third meeting, respectively. Shri S. N. Ravikant, Director of Industries, Punjab, attended the first meeting, Shri J. S. Basur attended the second meeting and Shri L. K. Sehgal attended the third meeting. The Government of Pepsu was represented by Dewan Walaiti Ram at the first meeting, and by S. J. S. Jaijee at the second and the third meetings. Shri C. Padmanabhan and Shri Prithvi Singh represented the Government of Rajasthan at the first two and third meeting, respectively. Shri L. D. Arora of the Punjab P. W. D., Electricity Branch, worked as the Secretary of the Committee for the first few months and was followed by Shri M. L. Ghai for the remaining period. Shri B. C. Sood of the Punjab P. W. D., Electricity Branch, attended all the meetings by invitation and also worked as a member of the Technical Sub-Committee. Shri Mela Ram Sood represented the Punjab Licensees Association and attended all the three meetings. Shri Janki Das Kapur represented the Punjab and Delhi Chamber of Commerce and attended the first and second meetings. S. Jaswant Singh Bhagat, representing the Indian Chamber of Commerce, attended the second and third meetings.

3. The first meeting of the Committee was held on the 6th and 7th March, 1952. The general scope of the work before the Committee and the broad principles involved in the framing of tariffs for the Bhakra-Nangal Project were discussed. The general requirements of the various tariffs, which would contribute towards the rapid sale of power on the one hand and prospects of making the Project productive as early as possible on the other, were

considered at length and tentative decisions taken. In view of the amount of detailed technical work involved in the formulation of definite tariff proposals, a Sub-Committee consisting of Shri S. Swayambu and Shri B. C. Sood was appointed to prepare a preliminary report for the consideration of the Committee. Shri S. Swayambu was also authorised to contact the existing large industries in the Punjab and Pepsu and make a study of their working costs, including power generation, with a view to assessing levels of tariffs that would be acceptable to large industries.

The Technical Sub-Committee submitted a report in May, 1952, but meanwhile under the supervision of the Bhakra Control Board several modifications in respect of the capital cost and load data had to be made in the Project Estimate, which remained under scrutiny and revision during the whole of the period of the Committee's work.

4. The Sub-Committee's report was considered by the Committee The Second Meeting at the second meeting held on the 12th and 13th March, 1953. The various proposals were considered in detail and final decisions taken in regard to the policy and pattern of tariffs. A second Sub-Committee comprising Shri S. Swayambu, Shri M. L. Ghai and Shri B. C. Sood, was appointed to prepare a draft of the final report for consideration at the subsequent meeting. As some of the potential bulk supply and large industrial consumers were pressing for information in regard to the likely tariffs, it was agreed that the Chief Engineers concerned might inform such consumers of the tariffs proposed to be recommended by the Committee, with the reservation that these were subject to the orders of the Governments concerned.

5. The draft report was circulated to the members of the Committee The Third Meeting. towards the end of June, 1953. The third meeting was held on the 9th, 10th and 11th July, 1953, and the report was considered, and, after making the modifications agreed on, signed by the members.

6. The Committee regrets that it has not been able to submit a Delay in the Report. report within the period of six months contemplated by the Punjab Government. This has been substantially for reasons outside its control. Reference has already been made to the fact that throughout the period of its investigations, the Bhakra-Nangal Project Estimate has been under scrutiny and revision. That indeed remains true to-day. This revision has not been confined merely to details, but also involved fundamental questions, such as the installation of units at the Bhakra Dam. The Committee was of the view that some of these questions affected capital cost so vitally that it should await at least the major trend of decisions. Another factor has been the detailed load survey of Punjab, Pepsu and Rajasthan, which again involved basic data for framing financial returns. The detailed load survey of Punjab and Pepsu were made available during the course of the Committee's life, that of Rajasthan is still under investigation.

Though final decisions on some of these matters are still awaited, the Committee considers it advisable, in the interests of all parties concerned knowing the likely tariff structures as early as possible, to report on the best data available up to date. This data has bearing on the financial returns and to that extent the chapter on this subject is indicative rather than final. The Committee considers, however, that the tariffs proposed by it should stand irrespective of variations in the financial returns. The reasons for this view are set out in considering Tariff Policy at Chapter III.

7. The Committee, even though it involves its own members, would Acknowledgments. like to acknowledge the help it has received from the wide experience and wisdom of members from the Central Water and Power Commission, and the corrective and balance contributed by its non-official members.

The Committee would like to place on record its appreciation of the detailed and careful work done by the members of the Technical Sub-Committee, Sarv-Shri S. Swayambu and B. C. Sood, and of the drafting Sub-Committee which comprised these two gentlemen and Shri M. L. Ghai.

The Committee greatly appreciates the information readily supplied by the Engineers of the State Governments, particularly of the Punjab, from whom the bulk of the data was drawn.

Our Secretary, Shri L. D. Arora to start with, and Shri M. L. Ghai subsequently, has been invariably helpful.

CHAPTER II

SCOPE OF THE BHAKRA-NANGAL PROJECT

8. The Bhakra-Nangal Project, a combined irrigation and power development scheme to utilise the waters of the River Sutlej, by constructing a dam and power stations will serve the needs of irrigation and power over an extensive area of North-West India. The power plant will initially comprise four hydro-electric generators of an installed capacity of 24,000 kW each, located at the two Nangal power stations. These will be brought into commission in 1954-55 and 1955-56. Additional generating plant will be installed at the Bhakra Dam thereafter, to meet the increasing demand for power in future years. Power will be transmitted to major load centres over a network of 132 kV (a part of which will be stepped up to 220 kV at a later stage), 66 kV and 33 kV transmission lines. The area of supply will include most districts of the Punjab, the Pepsu, parts of Rajasthan, Himachal Pradesh, Delhi and possibly the western districts of the U. P. The total length of transmission lines will be about 1,300 miles, connecting 70 grid sub-stations. From these sub-stations, hundreds of miles of 11 kV sub-transmission lines will take power to the various towns and villages for final transformation and distribution to factories, farms and homes.

9. It has now been decided that the Electricity part of the Bhakra-Nangal Project should also be the joint responsibility of the States of the Punjab, Pepsu and Rajasthan. These States are now partners in the Project, and have agreed that such works as will afford common facilities to all the three States should represent the scope of the partnership undertaking termed "Common Pool". The capital investment relating to the Common Pool, and the resulting benefits, will be shared in the ratio of stored water supply of the Bhakra reservoir, which has been agreed to be as 62.36 : 22.42 : 15.22 for the Punjab, Pepsu and Rajasthan, respectively. The net profit or loss arising out of the Common Pool operations, determined before meeting interest charges, will also be shared by the partners in similar ratio. The responsibility for further transmission and distribution of power to the ultimate consumers, within their respective territories, will be that of the individual States and this part of the power supply operations will, therefore, be maintained separately by each State. The lines and sub-stations required to give bulk supply to outside States such as Delhi or the U. P., will also be included in the Common Pool. It is visualised that the Punjab State will manage the "Common Pool" on behalf of the three partners and the financial working of the Common Pool will be independent of the "Retail Distribution" of power in the Punjab.

10. The results of a systematic load survey conducted by the Central Water and Power Commission show reasonably good potentialities of load development in the Punjab and Pepsu. A similar load survey is being investigated in the relevant districts of Rajasthan during 1953. The following figures are an indication of the anticipated

loads in the Bhakra-Nangal area during the first ten-year period. A detailed load forecast is given at appendix I of this report.

Table I—Bhakra-Nangal Project—Abstract showing Load Forecast

Area	SYSTEM MAXIMUM DEMAND IN KILOWATTS		
	1955-56	1959-60	1964-65
Punjab ..	31,610	50,730	71,440
Pepsu ..	10,895	23,520	30,015
Rajasthan ..	3,600	4,800	6,300
Delhi ..	20,000	20,000	30,000
U. P. • ..	5,000	9,000	10,000
Total ..	71,105	108,050	147,755

*The U. P. Government have not yet indicated their willingness to take a bulk supply and the above figures are based on a probable expectation.

During 1952-53, the existing Uhl River Power System in the Punjab generated 33,200 kW of maximum demand and 158 million kWh of electrical energy. The figures in Table I indicate the comparative magnitude of power-supply operations visualised for the Bhakra-Nangal Project. It is expected that supply will be extended to about 70, 49 and 39 medium and small towns in the States of Punjab, Pepsu and Rajasthan, respectively, and in addition to large rural areas.

11. The following extract from the latest available project estimates indicates the magnitude of capital investment contemplated on the power development from the Bhakra-Nangal Project (including such Civil Works as are exclusively intended for power generation) as at the end of 1964-65 :—

Table II—Bhakra-Nangal Project—Capital to be invested on Electrical side by 1964-65

COMMON POOL

Rs

(In lakhs)

(i) Production—Electrical and Civil Works—with 4 units of Nangal and 2 units of Bhakra ..	20,60
(ii) Transmission ..	12,25
Total ..	32,85

PARTICIPATING STATES

(Rupees in lakhs)

	Punjab	Pepsu	Rajasthan	Total
(1) Share of Common Pool ..	20,49	7,36	5,00	32,85
(2) Transmission—66 kV and above (other than Common Pool) ..	2,03	1,00	2,83	5,86
(3) Sub-transmission—33 kV ..	3,25	1,15	28	4,68
(4) Local Distribution (including bulk supply to Licensees) ..	7,92	3,30	2,57	13,79
Total ..	33,69	12,81	10,68	57,18

It is understood that the question of installing power generation equipment at the Bhakra Dam has been referred by the Government of India to a high-power committee. The final policy decision on this matter is likely to be taken after the recommendations of this Committee are received. In the meantime, the financial results of the project in this report have been worked out on the basis of 4 sets at Nangal and two sets at Bhakra. Table II above and the detailed financial returns given in Chapter VI are based on this assumption, and in this connection the remarks made in the first sub-paragraph of paragraph 45 apply. It is of interest to record that the cost of the dam and such other works as are common to irrigation and power are not to be debited to the electricity operations but an annual charge is to be levied by Irrigation Department for the use of water in proportion to the power generated year after year.

CHAPTER III

TARIFF POLICY

12. The Bhakra-Nangal Project is a partnership between the Punjab, Rajasthan and Pepsu. Following from this, it is necessary to consider tariffs at two stages :—

Tariffs at bulk and retail stages.

- (1) The sale of power in bulk from the Common Pool to the three partners and to outside bulk consumers such as Delhi ; and
- (2) the sale of power at the retail stage to consumers in each State.

The power generated will, in the first instance, be sold to the partners and outside States, and the revenue so realised will form the income of the Common Pool. As against this revenue will be offset the charges, except interest, on the generation and transmission of power in bulk. The surplus or deficit in the annual operations of the Common Pool will be passed on to the participating States, to be shared by them in the ratio of their share in the Stored Water Supply. The participating States will thus pay to the Common Pool the cost of bulk power purchased by them, and incur all the cost of transmission, sub-transmission and distribution at the retail stage. They will receive in return the revenues from the retail sale of power to consumers.

13. Normally the assessment of tariffs would be governed by two main factors :—

Basis for determining tariffs.

- (1) The amount which the consumer is able to pay, which, put, more crudely, may be described as " the amount the traffic can bear " ; and
- (2) what is necessary for the Project to charge, having regard to the investment and operation costs.

In examining these, the following important considerations have been kept in mind :—

- (a) The Bhakra-Nangal Project is a large Hydro-Electric System, planned and constructed on a long-term basis. In the case of the Nangal Project, for example, some of the Civil Works and transmission lines have been designed and constructed so as to take care of load conditions which will mature several years hence. The construction of such works at the initial stage is, however, justified by overall economic and technical reasons. In these circumstances, it would not be fair to the consumer, or, as we will endeavour to show later, even to the Project, to debit the incidence of investment and operation costs in full to the consumer from the very initial stages.

- (b) A balance must be struck between the immediate cost to Government of making power available to the consumer, and the prospect of an increased load development by keeping costs low at the initial stage. It is a significant feature of a Hydro-Electric Scheme that costs of generation and operation do not go up in direct proportion to the amount of energy produced ; in fact, the higher the amount of energy produced and utilised, the lower the unit cost to the Project. It is, therefore, essential to constantly keep in mind a level of tariffs which will be an adequate incentive to consumers to take on large quantities of energy. Thus for the long-term stability and productivity of the Project itself, it would be short-sighted to base tariffs exclusively on costs at the initial stage.
- (c) The Project must also be considered in the background of the total attempt of the Governments concerned to develop their areas and to provide amenities, both economic and otherwise, to the people.

In these circumstances, the Committee has decided to frame tariffs on a pragmatic basis, keeping in the fore-front a level of rates which would be acceptable, if possible even welcome, to the consumer, and which afford promise of the rapid development of electricity in industry, agriculture, and in homes. In determining such rates we have taken into account and constantly compared data relating to—

- (i) comparable rates for other large power systems in India, particularly power systems in the immediately contiguous areas ;
- (ii) present-day commodity prices and the economics of industrial production, with a view to assessing the extent of burden which could reasonably be imposed on the consumer ; and
- (iii) the cost of alternative sources of power, more particularly thermal power at Delhi, which, it is hoped, will be a large bulk consumer.

It would, however, be incorrect to assume that the Committee has entirely ignored the question of relating tariffs to the capital and operation cost. It has, indeed, been one of our problems not to allow too big a gap between tariffs which we would consider ideal from the point of view of the consumer and future development, and the fact that the Project is being constructed at a period of high costs, the incidence of which cannot be ignored. We are satisfied that the picture of tariffs we present represents a reasonable and practical compromise between these two somewhat irreconcilable elements in the situation. A detailed consideration of probable revenues and the productivity of the Project, on the basis of our recommendations, is made at Chapter VI.

14. The Committee has considered the question of how far uniform Uniformity in tariffs. tariff rates are possible and desirable as between the different States which will be receiving power. At the bulk stage it has come to the conclusion that the tariff should be uniform not only as between the three participating partners, but also in supplies given to outside States, such as Delhi. This would be applicable to the sale of the entire amount of power at different points on the 132 kV Grid Sub-stations. Slight adjustments would, of course, be necessary on account of the difference in the voltages of supply and metering at some of the Sub-stations. The Committee is strongly of the view that a system of preferential tariffs for the owners of the Project, as against outside bulk consumers, is neither justified nor desirable. In a

Project producing the large volume of electricity expected from Bhakra-Nangal, it is most important that we should at all times be able to convince our bulk consumers that we are out to render them the cheapest service possible. Apart from this somewhat practical reason, there is also the fact that such practice is in keeping with the idea of exploiting resources to the maximum possible regional benefit. As between the three partners also we recommend that a uniform grid tariff rate should apply. In regard to retail tariffs, we are also of the view that there should be uniformity in the areas served by the three partners.

15. A specific term of reference of the Committee is the question of

The Uhl River and the Bhakra-Nangal Systems.

uniform tariffs for the Uhl River and the Bhakra-Nangal Projects. The Committee strongly recommends that the two sets of tariffs should be identical. Apart from the difficult position in which the State Government of the Punjab will find itself in endeavouring to justify one set of rates for areas fed from one system, and another set of rates for areas fed from the other system, there is also the fact that it is planned, for technical and commercial reasons, to bring the two systems into a single operating unit. It is essential that any differences in regard to the commercial policies of the two systems should be removed as early as possible. The Committee recommends further that the tariffs proposed in this report should be applied to the Uhl River area immediately, even before the start of the Bhakra-Nangal Project, so that experience in working these tariffs may be gained in the interim period.

16. It will perhaps not be possible to rigidly follow the policy of

Tariffs for Licensees.

insisting that the retail tariffs should be applied to licensees' areas, even where such licensees are buying in bulk from the Bhakra-Nangal Project. The financial operations of licensees are governed by the Electricity (Supply) Act, 1948, which permit a "fair return" of 5 per cent on the undertaking's "capital base". Subject to this licensees are free to adjust tariff levels in their areas. While an attempt should certainly be made to ensure uniform retail rates, it will not be possible to pursue it to the extreme.

The Committee, however, considers it necessary, in the interest of the fullest development of industry, to extend the benefit of a reasonable tariff for large industrial concerns even when these are located in the licensees' areas. This may be achieved by providing in the bulk supply agreements between the Government and the licensees that industries with a demand above 100 kW should be supplied at the Government's standard industrial power tariff. To achieve this a corresponding amount of the licensees' bulk consumption should be charged for by the Government at the standard industrial rate, less a discount of 5 per cent. Another solution of the problem would be that in cases where the Government is satisfied after giving the licensee an opportunity to explain the case that it is beyond his resources to cater for such loads, the Government should reserve the right to supply such industries direct.

17. The present tariff patterns in India have been formulated mostly

Basis for retail tariffs.

several years ago, and there is considerable scope for rationalization. This applies also to the Uhl River tariffs, which were drawn up during 1930—32, according to the data and conditions of the time. It is hoped that the volume of power sales in future years will be far greater than in the past, and it is essential to introduce modern and scientific tariff patterns, which would be simple to work, and, at the same time, take into consideration load factors, power factors, diversity, promotional needs, etc. The Committee has viewed its task keeping this need in the fore-front. It considers that the following 8 tariffs should cover all classes of consumers :—

(1) Large Industrial Power Tariff.

(2) Medium Industrial Power Tariff.

(3) Small Industrial Power Tariff.

- (4) Agricultural and Cottage Industrial Power Tariff.
- (5) Commercial Power and Lighting Tariff.
- (6) Domestic Power and Lighting Tariff.
- (7) Street Lighting Tariff.
- (8) Bulk Supply Tariff for Distributing Licensees.

Each one of these tariffs will be considered in detail in the following chapters:—

CHAPTER IV

TARIFF PATTERNS

I—The Grid Tariff

18. It is expected that the various State undertakings will take bulk supply at the points of the grid and at the voltages shown below :—

Grid Points and Voltages.

Table III—Bulk Supply—Grid Points and Voltages

(Note. This table is provisional as the final plan is under examination.)

Punjab—

(1) Nangal	.. (11 kV)
(2) Ambala	.. (66 and 33 kV)
(3) Panipat	.. (66 and 33 kV)
(4) Delhi	.. (66 and 33 kV)
(5) Hansi	.. (66 and 33 kV)
(6) Ludhiana	.. (66 and 33 kV)
(7) Bhiwari	.. (66 and 33 kV)
(8) Moga	.. (66 and 33 kV)
(9) Muktsar	.. (66 and 33 kV)
(10) Abdullapur	.. (66 and 33 kV)

Pepsu—

(1) Ambala	.. (66 and 33 kV)
(2) Ludhiana	.. (66 and 33 kV)
(3) Hansi	.. (66 and 33 kV)
(4) Bhiwar i	.. (66 and 33 kV)
(5) Surajpur	.. (66 kV)
(6) Muktsar	.. (66 kV)

Rajasthan—

(1) Ganganagar	.. (132 kV)
(2) Rajghat	.. (132 kV)

Delhi State Electricity Board—

(1) Delhi	.. (33 kV)
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U. P. Hydel (if supplied)—

(1) Saharanpur	.. (132 or 66 kV)
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19. A single grid tariff, applicable on the meter readings taken at each point of supply, will be the most satisfactory method of charging. Table IV shows the tariff recommended.

Table IV—The Proposed Grid Tariff

Demand Charge—

Rs 5 per kVA per month.

plus

Energy Charge—

0.450 anna per kWh for the first 500,000 kWh per month
 0.425 anna per kWh for the next 1,500,000 kWh per month
 0.400 anna per kWh for all in excess of 2,000,000 kWh per month

Subject to an overall maximum of 0.8 anna per kWh.

20. This tariff has been framed to make it possible for bulk purchasers to re-sell power in retail to consumers at reasonable rates, after meeting the cost of sub-transmission and distribution. It is expected that this tariff will compare favourably with the present and probable future cost of thermal power generation at Delhi. It is designed to make it attractive even should the Delhi State Electricity Board use Nangal Power as a base load supply, by utilising their steam power plant to take the system peaks. It should also be worthwhile for the U. P. Hydel (which is dependent upon a substantial amount of thermal power) to take a bulk supply. Table V below shows the overall kVA-year and kilowatt-hour charges for various loads and load factors.

Table V—Grid Tariff—Overall kVA and kWh charges at various Loads and Load factors

(Note. The power Factor is assumed at 85 per cent).

Load	30 PER CENT L. F.		50 PER CENT L. F.		70 PER CENT L. F.		90 PER CENT L. F.	
	Rs per kVA per annum	Over all rate in annas per kWh	Rs per kVA per annum	Overall rate in annas per kWh	Rs per kVA per annum	Overall rate in annas per kWh	Rs per kVA per annum	Overall rate in annas per kWh
500 kVA ..	123	0.300	165	0.708	206	0.634	248	0.593
1,000 kVA ..	123	0.800	165	0.708	206	0.634	247	0.590
2,500 kVA ..	123	0.800	163	0.699	202	0.621	242	0.577
5,000 kVA ..	121	0.800	161	0.691	200	0.613	237	0.566
10,000 kVA ..	120	0.800	158	0.678	195	0.598	232	0.554
20,000 kVA ..	118	0.800	155	0.668	193	0.591	230	0.549

21. In applying the Grid Tariff certain adjustments will be necessary :—

Application of the Grid
Tariff Adjustments

- (1) The supply and metering at most of the sub-stations will be at 66 kV or 33 kV, which are taken to be the normal reference voltages, for this tariff. In some cases, however, the voltage of supply and metering will be 11 kV, and possibly 132 kV depending upon technical considerations. In order to cover such conditions, adjustments to the tariff will be necessary and these are reproduced at the appropriate tariff schedule, at para 36.
- (2) The case of bulk supply to Pepsu at Surajpur will have to be dealt with differently as the metering will be done at 3.3 kV, the 66 to 3.3 kV sub-station being the property of the Government of Pepsu. It is not necessary to provide a second set of meters at 66 kV, as the readings of the 3.3 kV meter could be suitably adjusted for the purpose of charging Pepsu State for the bulk supply. The cost of operation and maintenance of the section of the line from Ambala to Surajpur (which will be owned and maintained by the Punjab State) could be shared by the two States on an agreed basis. A similar procedure may be adopted for the supply to Pepsu at Solan, Doraha, etc.
- (3) The Grid tariff will be applicable for the demand and consumption of each individual point of supply ; for example, if the Punjab State takes supplies from "The Common Pool" at 20 places, the total charges will be the aggregate of 20 separate bills corresponding to the same number of meter readings.

- (4) If an electro-chemical or an electro-metallurgical industry is located in any of the participating or outside States, and is offered a tariff in the form suggested at para 25 of this report, the State concerned should in turn be charged, for that quantum of power, the identical tariff less a discount up to 5 per cent to be agreed upon with the Common Pool.

II—RETAIL TARIFFS

A—The Large Industrial Power Tariffs

22. The Large Industrial Power Tariff will include all loads above 100 kW (or above 125 kVA), the majority of which will fall between 100 kW and 500 kW, the rest being somewhat larger—in some cases as much as 5,000 kW. In order to provide adequate incentive to the growth of industry, the Committee has decided to fix the level of this tariff about 20 per cent higher than that of the grid tariff, at a load factor of 50 per cent, and about 10 per cent higher than the grid tariff at a load factor of 90 per cent. Table VI shows the Tariff.

Table VI—The Large Industrial Power Tariff

Demand Charge—

Rs 5 per kVA per month.

Plus

Energy Charge—

0.65 anna per kWh for the first 100,000 kWh per month.

0.60 anna per kWh for the next 200,000 kWh per month.

0.55 anna per kWh for all in excess of 300,000 kWh per month.

Subject to (i) a rebate of 0.15 anna per kWh on all units in excess of 360 kWh per kVA per month or 420 kWh per kW per month;
(ii) a maximum overall rate of 0.9 anna per kWh, without prejudice to the minimum payments given under the appropriate tariff schedule under para 37.

23. In view of the additional cost involved in kVA metering, it may be advantageous to assess the maximum demand in kilowatts for loads below 250 kVA and charge for it at Rs 5-8-0 per kW per month. The maximum overall rate will provide adequate protection to the consumer against low load factors and the special rebate will offer incentive for high load factors. This tariff will result in the following overall kVA and kWh charges at different loads and load factors of consumers :

Table VII—Large Industrial Power Tariff—Overall kVA and kWh charges at various Loads and Load factors

(Note. Power factor is assumed at 85 per cent)

Load	30 PER CENT L.F.		50 PER CENT L.F.		70 PER CENT L. F.		90 PER CENT L. F.	
	Rs per kVA per annum	Overall rate in annas per kWh	Rs per kVA per annum	Overall rate in annas per kWh	Rs per kVA per annum	Overall rate in annas per kWh	Rs per kVA per annum	Overall rate in annas per kWh
126 kVA ..	150	0.900	211	0.900	266	0.803	305	0.733
250 kVA ..	150	0.900	211	0.900	261	0.801	303	0.723
500 kVA ..	150	0.900	207	0.890	253	0.778	295	0.705
1,000 kVA ..	148	0.900	203	0.872	245	0.751	282	0.675
1,500 kVA ..	147	0.900	198	0.851	240	0.736	277	0.662
2,500 kVA ..	143	0.900	194	0.834	238	0.725	273	0.651
5,000 kVA ..	140	0.900	193	0.821	233	0.715	270	0.645

24. This tariff should be readily acceptable to the existing large factories, such as the paper mills at Yamuna Nagar and the cement factories at Surajpur and Dadri. It is hoped that these factories will find it profitable to take their entire power requirements from the Project from the very start of grid supply and will close down their existing thermal plant. The tariff should also prove sufficiently attractive to new industries, which may be located in the area served by the Project. The general level of this tariff, as compared with those of other undertakings, will be seen from the following table:—

Table VIII—Large Industrial Power—Tariff comparison with tariff on other systems

Name of undertaking	DEMAND—1,000 kVA		DEMAND—2,500 kVA			
	50% L.F.	70% L.F.	90% L.F.	50% L.F.	70% L.F.	90% L.F.
Bhakra-Nangal (Proposed) ..	0.872	0.759	0.679	0.834	0.725	0.651
U. P. Hydel ..	0.933	0.809	0.741	0.870	0.765	0.706
U. P. (Kanpur) ..	1.275	0.924	0.863	0.932	0.851	0.725
Delhi (Coal at Rs 30 ton) ..	0.865	0.865	0.865	0.865	0.865	0.865
Uhl River ..	0.644	0.591	0.561	..	..	..
Damodar Valley (Coal at Rs 9 ton) ..	0.794	0.703	0.650	0.771	0.677	0.621
Calcutta (Coal at Rs 23/10 ton) ..	0.684	0.644	0.614	0.554	0.534	0.514
Madras Hydro ..	0.541	0.483	0.444	0.485	0.431	0.372
Tata Hydro (Bombay) ..	0.556	0.548	0.487	0.535	0.496	0.475

This tariff, it will be seen, is lower than those in the neighbouring States of Delhi and the U. P., and is fairly near to D. V. C. It is about 20 per cent higher than the Uhl River tariffs, but the Committee feels that it is neither possible nor necessary to come down to that level.

25. While this tariff should be acceptable to most industries, it obviously will be excessive in the case of electro-chemical and electro-metallurgical industries, which consume a comparatively large amount of power. In order to attract such industries to the area served by the Project, it is necessary to offer a special tariff. It is suggested that it may be a flat kVA-year tariff of Rs 180 per kVA per year for loads from 500 kVA to 5,000 kVA, subject to an overall rate of 0.5 anna per kWh. At a load factor of 90 per cent, the above tariff works out to 0.38 anna per kWh which should prove to be an economical rate for this type of industries. There are possibilities for the establishment of small electric furnaces for steel manufacture work in the Punjab and Pepsu and this tariff may also be offered to them, even though the demand is less than 500 kVA. In special cases, where the demand exceeds 5,000 kVA, a further reduction down to Rs 160 could be made. It is not necessary to publish this tariff as a standard schedule, as it would be more satisfactory to deal with such loads by negotiation. This tariff could form the basis for such negotiations, and it is recognised that some deviation will be inevitable having regard to the special circumstances of each case. As these special rates are linked up with the Grid Tariffs of the "Common Pool", the State concerned should obtain the prior consent of the Common Pool, to the tariffs finally offered to such industries.

B—The Medium Industrial Power Tariff

26. This tariff is intended to cover supply to industrial loads from 20 to 100 kW (about 125 kVA) for 3 phase, 400V. supply. The following two part tariff is recommended:—

The Medium Industrial Power Tariff.

Table IX—The Medium Industrial Power Tariff.

Demand Charge—

Rs 6 per kW per month
plus

Energy Charge—

0.85 anna per kWh for the first 5,000 kWh per month

0.75 anna per kWh for the next 10,000 kWh per month

0.70 anna per kWh for all in excess of 15,000 kWh per month

Subject to a maximum overall rate of 1.5 anna per kWh without prejudice to the minimum payments given under the appropriate tariff schedule under para 37.

The above tariff would result in an average rate of 1 to 1.25 anna per kWh and would be sufficiently attractive to medium sized industries. A rebate of 7½ per cent will be allowed if supply, at the option of the supplier, is given at 11,000 V.

C—The small Industrial Power Tariff

27. This tariff is applicable to industrial loads below 20 kW for 3 phase 400 V supply and should be as follows:—

The Small Industrial Power Tariff.

Table X—The Small Industrial Power Tariff

1.75 anna for the first 500 kWh per month

1.50 anna for the next 1,000 kWh per month

1.25 anna for all in excess of 1,500 kWh per month

Subject to a monthly minimum payment of Rs 3 per BHP, of connected load, per month; for approved seasonal industries, the minimum payment should be charged annually at Rs 36 per BHP per year.

The above charges would give the necessary encouragement to the development of small industries in the Punjab for which there is good scope particularly in the urban and semi-urban areas. Some idea as to the level of charges for small industries prevailing in other undertakings in India can be had from the following table:—

Table XI—The Small Industrial Power Tariff—Comparison with charges on other systems

Name of the Power System	Rate per kWh (Annas)
Bhakra Nangal (proposed)	.. 1.25 to 1.75
U.P. Hydel	.. 0.75 to 1.75
U.P. (Kanpur)	.. 1.25 to 2.00
Delhi	.. 1.25 to 2.00
Uhl River	.. 0.90 to 1.50
Calcutta	.. 0.75 to 1.00
Madras Government	.. 0.75 to 0.90
Travancore-Cochin Government	.. 0.75 to 1.00
Bombay	.. 0.75
Mysore	.. 0.70 to 1.10

D—The Agricultural and Cottage Industrial Power Tariff

28. The Committee considered at length the desirability of adopting a uniform small power tariff for both the urban and the rural areas. This would mean the application of the tariff in para 27 above, to agricultural and other loads in rural areas. In view of the fact, that the economy of the country justifies some special encouragement to agricultural production and small scale cottage industries in rural areas, it has been decided to recommend the adoption of a slightly lower level of charges for them as in the tariff given below:—

Special Tariff for Agriculture and Cottage Industries.

Table XII—The Agricultural and Cottage Industrial Tariff

1.50 annas per kWh for the first 1,500 kWh per month
1.25 annas per kWh for all in excess of 1,500 kWh per month

Subject to annual minimum payment of Rs 36 per BHP per year.

29. For purposes of this tariff, a cottage industry should be defined as “an industry located in a rural area using an electric motor or other appliance with a connected load up to 10 BHP”. A load greater than 10 BHP will not be classified as a “cottage industry” and will be charged for at the small industrial power tariff of para 27 above. In case of agricultural loads the corresponding limit will be 26 BHP. For providing line extensions in rural areas, it will be necessary to demand certain minimum guaranteed revenue from the consumer to justify the high initial cost of service. The minimum payment of Rs 36 per BHP per year recommended above will cover a fair number of such consumers, but a good many will still remain from whom larger guarantees will have to be taken.

Limit for eligibility for this Tariff.

E—Commercial Power and Lighting Tariff

30. The Committee feels that two different types of tariffs, one for Commercial Power and Lighting and the other for Domestic Power and Lighting would help the larger use of electricity in the home and in business premises. Having regard to the commercial value of electricity in business houses there is justification for the charges for that group being fixed at a slightly higher level. The commercial tariff is intended to be made applicable to all business premises including cinemas, public offices, schools, hospitals, small workshops, battery charging shops, etc. The following tariff is recommended:—

Distinction between Commercial Power and Lighting; and Domestic Power and Lighting.

Table XIII—Commercial Power and Lighting Tariff

For the first 30 kWh per month	.. 5 annas per kWh
For the next 50 kWh per month	.. 2 annas per kWh
For all in excess of 80 kWh per month	.. 1.5 annas per kWh

Subject to a monthly minimum payment of Rs 2 for the first 1kW of connected load plus Rs 1-8 0 for each additional 1kW

This tariff may be offered to combined power and lighting loads up to a demand of 3kW for supply through a single phase 230V service and up to 10kW on three phase 400V service. Ordinarily, loads in this group may not exceed a demand of 10 kW, but in exceptional cases, there need be no objection to serving larger loads on this tariff. This form of composite tariff would avoid installing separate meters by Government, and separate wiring circuits by consumers, thus effecting substantial economy for both.

F—Domestic Power and Lighting Tariff

31. The pattern of tariff for this supply should be similar to that for Commercial Power and Lighting but with the charges fixed at a lower level with a view to promoting the larger use of electricity in the home:—

Domestic Power and Lighting Tariff

Table XIV—Domestic Power and Lighting Tariff

For the first 15 kWh per month	.. 5 annas per kWh
For the next 25 kWh per month	.. 2 annas per kWh
For all in excess of 40 kWh	.. 1 anna per kWh
Subject to a monthly minimum payment of Rs 1-8-0 for the first 1 kW of connected load and Re 1 for each additional kW of connected load.	

This tariff should be assessed as very reasonable from the consumer's point of view, and is comparable with the prevailing charges in many other undertakings in India, barring some large urban systems like Calcutta and Bombay. It should help to promote the larger use of electrical appliances by consumers, and will reduce the cost of providing separate meters and wiring due to the composite charge for lighting and domestic appliances. It was suggested to the Committee that an unmetered supply charged on a "per lamp" basis should be offered to encourage the use of electricity for lighting purposes in small homes, and for casual use. The Committee feels that this method of service will not result in any marked reduction in the charges for supply and is liable to grave misuse of energy. The Committee is, for these reasons, not in favour of such a tariff.

G—Street Lighting Tariff

32. It is recommended that the Street Lighting Tariff should be in two parts—(1) a fixed component to cover the line maintenance and the lamp renewal charges which under the present circumstances should be Rs 1-8-0 per month up to 40W lamps, Rs 1-12-0 for 60 and 75 W lamps and Rs 2 for 100W lamps. For lamps above 100W and special lamps separate rates shall have to be determined, and (2) a variable component to cover the energy consumed. It is recommended that the energy charged should be 2.25 annas per kWh for Street Lighting supply.

Street Lighting Tariff

H—Bulk Supply Tariff (to Distributing Licensees)

33. It is expected that most of the undertakings would take a bulk supply at 11 kV and the following rates are proposed for supply at that voltage:—

Tariff for licensee

Table XV—Bulk Supply Tariff for Licensees

Demand Charge—

Rs 5-8-0 per kVA per month
plus

Energy Charge—

0.70 anna per kWh for the first 10,000 kWh per month
0.65 anna per kWh for the next 20,000 kWh per month
0.60 anna per kWh for all in excess of 30,000 kWh per month

Subject to (i) an overall maximum of 1.25 annas per kWh.

(ii) minimum payments given under the appropriate tariff schedule under para 43.

For such licensees who would like to take the bulk supply at 400V, a surcharge of 7½ per cent would be levied on the above tariff. Most of the licensees at the present time in the Punjab and Pepsu are dependent upon expensive diesel generation. This tariff should prove quite attractive to them and will enable them to offer cheaper rates to their consumers. For loads below 250 kVA, it may be advantageous to assess the demand in kilowatts and charge for it at Rs 6 per kW per month for supply at 11,000 V.

It is recommended that the bulk supply to undertakings (both private and State-owned) situated in Himachal Pradesh and Bilaspur States should be offered at this tariff. In regard to the portion of supply for large industries within these undertakings the standard industrial rate less 5 per cent may be allowed as suggested in para 16.

III—Rates and/or schedules for items other than the cost of electricity, e.g., Meter hire, service rentals, etc.

34. The Committee has decided that the rates and/or schedules for items other than the cost of electricity, service rentals etc., etc. should be fixed by the respective State Governments.

Schedule for Meter Hire,
Service Rentals, etc.

CHAPTER V

TARIFF SCHEDULES

35. The tariffs recommended in the previous chapter are reproduced in this Chapter in the form of detailed schedules.

Scope of this Chapter

36. *Schedule G.S. —Grid Supply—*

(1) *Availability.* Available as primary power from the Common Pool to the participating States and to the outside States for re-sale to distributing licensees and consumers.

(2) *Character of Service.* A.C. 50 cycles, 3 phase, 66 kV or 33 kV ordinarily and at 132 kV or 11 kV in special cases.

(3) *Tariff—*

Table XVI—Detailed Schedule for Grid Supply Tariff

Demand Charge—

Rs 5 per kVA per month
plus

Energy Charge—

0.450 anna per kWh for the first 500,000 kWh per month

0.425 anna per kWh for the next 1,500,000 kWh per month

0.400 anna per kWh for all in excess of 2,000,000 kWh per month

Subject to —(i) an overall maximum of 0.8 anna per kWh without prejudice to the minimum payment under item (5) below.

(ii) the following adjustments for the different voltages of supply and metering:—

Voltage at which power is delivered to consumer	Voltage at which power is actually metered	Adjustment to the Standard Grid Tariff (<i>plus</i> means add, <i>minus</i> means deduct)
1. 132 kV ..	132 kV ..	—5 per cent
2. 132 kV ..	66 or 33 kV ..	—4 per cent
3. 66 or 33 kV ..	132 kV ..	—1 per cent
4. 66 or 33 kV ..	66 or 33 kV ..	Nil
5. 66 or 33 kV ..	11 kV ..	+1 per cent
6. 11 kV (at generating stations) ..	11 kV ..	Nil
7. 11 kV (at sub-stations involving single transformation from 132 kV) ..	11 kV ..	+1 per cent
8. 11 kV (at sub-stations involving double transformation from 132 kV) ..	11 kV ..	+—5 per cent

(4) *Demand Assessment.* The maximum demand shall be defined as the highest average load measured in kilovolt-amperes during any 30 consecutive minutes period of the month. The demand charge shall be based on (i) the actual maximum demand during the month; or (ii) 75 per cent of the highest maximum demand during the preceding 11 months; or (iii) 50 per cent of the contract demand, whichever is the highest: Provided that, for the first eleven months from the commencement of supply, alternatives (ii) and (iii) shall not be applicable.

(5) *Monthly Minimum Payments.* The monthly minimum payment shall be limited to the demand charge payable under item (4) above.

(6) *Single Point Supply.* This tariff is based on the supply being given through a single delivery and metering point at a single voltage. Supply at other points of delivery or at different voltages shall be separately metered and billed.

37. *Schedule L. S.—Large Industrial Power Supply—*

(1) *Availability.* Available as primary power to all large industrial power consumers for demands over 100 kW (or about 125 kVA).

(2) *Character of Service.* A. C. 50 cycles, 3 phase, 11 kV or at 6.6 kV and 3.3 kV wherever possible at the discretion of the supplier; supply at 400 V may be allowed in special cases and charged for under Schedule M. S.

(3) *Tariff—*

Table XVII—Detailed Schedule for Large Industrial Power Supply Tariff

Demand Charge—

Rs 5 per kVA per month
plus

Energy Charge—

0.65 anna per kWh for the first 100,000 kWh per month
0.60 anna per kWh for the next 200,000 kWh per month
0.55 anna per kWh for all in excess of 300,000 kWh per month

Subject to (i) a rebate of 0.15 anna per kWh for all units in excess of 360 kWh per kVA per month or in excess of 420 kWh per kW per month if the demand charge is based on kilowatts as per item (5) below:—

(ii) a maximum overall rate of 0.9 anna per kWh without prejudice to the minimum payment at item (5) below.

(4) *Demand Assessment.* The demand for any month shall be defined as the highest average load measured in kilovolt-amperes during any 30 consecutive minutes period of the month. The monthly demand charge shall be determined as follows:—

(a) For loads with maximum demand from 126 kVA to 250 kVA and for approved seasonal factories, it shall be based on the actual monthly maximum demand.

(b) For loads with maximum demands above 250 kVA, it shall be based on (i) the actual maximum demand during the month; or (ii) 75 per cent of the highest maximum demand during the preceding eleven months; or (iii) 50 per cent of the contract demand, whichever is the highest: Provided that for the first eleven months from the commencement of supply alternative (ii) shall not be applicable.

(c) For loads between 125 kVA and 250 kVA, the supplier shall reserve the right to measure the maximum demand in kilowatts and charge for it at Rs 5-8-0 per kilowatt per month. In this case, if the consumer's power factor is lower than 85 per cent, the demand shall, at supplier's option, be defined as 85 per cent of the highest average kilovolt-amperes measured during any 30 consecutive minutes period of the month.

(5) *Monthly Minimum Payments.* (a) For loads with a maximum demand below 250 kVA the monthly minimum payment shall be Rs 5 per kVA or Rs 5-8-0 per kW (if the demand is metered in kW) on 50 per cent of the contract demand.

(b) For approved seasonal factories, it shall be reckoned annually at Rs 45 per kVA or Rs 50 per kW (if the demand is metered in kW) per year on the highest maximum demand registered in any month during the calendar year.

(c) For other loads, it shall be limited to the demand charge payable under item 4(b) above.

(6) *Factory lighting and Colony Supply.* All consumption for *bona fide* factory lighting shall be included for charge under the above tariff. The consumption for residential and re-sale purposes for the factory's staff quarters, street lighting of colony, etc., shall be subject to an additional charge of 0.75 anna per unit on the readings of meters suitably installed by the supplier at the 400/230 V side of the consumer's transformers.

(7) *Payment.* The above rates are net. In the event that the monthly bill is not paid in full within the time specified in the bill, a surcharge of 1 per cent shall be levied for each 30 days successive period or part thereof until the amount is paid in full.

(8) *Single Point Delivery.* The above tariff is based on the supply being given through a single delivery and metering point and at a single voltage. Supply at other points or at other voltages shall be separately metered and billed.

38. *Schedule M.S. – Medium Industrial Power Supply—*

(a) *Availability.* Available to all industrial power consumers with demands ranging from 21kW to 100kW.

(2) *Character of Service.* A. C., 50 cycles, 3-phase, 400V or at 11,000V at supplier's option.

(3) *Tariff—*

Table XVIII—Detailed Schedule for Medium Industrial Power Supply

Demand Charge—

Rs 6 per kW per month
plus

Energy Charge—

0.85 anna per kWh for the first 5,000 kWh per month
0.75 anna per kWh for the next 10,000 kWh per month
0.70 anna per kWh for all in excess of 15,000 kWh per month

Subject to a maximum overall rate of 1.5 annas per kWh without prejudice to the monthly minimum payment in (5) below.

Note. The above tariff covers supply at 400V and rebate of 7½ per cent will be allowed if supply at the option of the supplier is given at 11,000 V.

(4) *Demand Assessment.* The demand for any month shall be defined as the highest average load measured in kilowatts during any 30 consecutive minutes period of the month.

(5) *Monthly Minimum Payment.* The monthly minimum payment shall be Rs 6 per kW on 50 per cent of the contract demand

(6) *Seasonal factories.* For approved seasonal factories, the demand charge shall be based on the actual monthly maximum demands, but the minimum payment shall be reckoned annually at Rs 54 per kW per year on the highest maximum demand registered in any month during the calendar year.

(7) *Factory Lighting.* For the factory's lights, fans and other non-industrial appliances, not exceeding 5 per cent of the total consumption energy will be supplied at the above tariff and for the excess Schedule C.S. for commercial supply will apply. For any residential quarters attached to the factory, Schedule D.S. will apply.

(8) *Payment.* The above rates are net. In the event that the monthly bill is not paid in full within the time specified on the bill, a surcharge of 2 per cent shall be levied for each 30 days successive period or part thereof until the amount is paid in full.

(9) *Single Point Delivery.* The above tariff is based on the supply being given through a single delivery and metering point and at a single voltage. Supply at other points or at other voltages shall be separately metered and billed.

39. *Schedule S.P.—Small Industrial Power Supply—*

(1) *Availability.* Available to small industrial power consumers with a demand not exceeding 20 kW.

(2) *Character of Service.* A. C., 50 cycles, 3-phase, 400V.

(3) *Tariff—*

Table XIX—Detailed Schedule for Small Industrial Power Supply

1.75 annas per kWh for the first 500 kWh per month

1.50 annas per kWh for the next 1,000 kWh per month

1.25 annas per kWh for all in excess of 1,500 kWh per month

(4) *Monthly Minimum Payment.* The monthly minimum payment shall be Rs 3 per BHP of connected load per month, for approved seasonal industries, the minimum payment shall be reckoned annually at Rs 36 per BHP per year.

(5) *Payment.* The above rates are net. In the event of the monthly bill not being paid in full within the time specified on the bill, a surcharge of 2 per cent shall be levied for each 30 days successive period or part thereof until the amount is paid in full.

(6) *Single Point Delivery.* The above tariff is based on the supply being given through a single delivery and metering point and at a single voltage. Supply at other points or at other voltages shall be separately metered and billed.

(7) *Factory Lighting.* For *bona fide* factory lighting the consumption of two lamp points not exceeding total of 100 watts will be permitted under this tariff.

40. Schedule A. P.—Agricultural and Cottage Industrial Power Supply—

(1) *Availability.* Available to (i) irrigation pumping and other agricultural purposes for loads with a demand not exceeding 20 kW (26 BHP); and (ii) cottage industries, which for purposes of this tariff are defined as “industries located in a rural area using an electric motor or such other appliance with a connected load up to 10 BHP”. For large loads, the Schedule SP or MP shall be applicable.

(2) *Character of Service.* A. C., 50 cycles, 3-phase, 400V.

(3) *Tariff—*

Table XX—Detailed Schedule for Agricultural and Cottage Industrial Power Supply

1·50 annas per kWh for the first 1,500 kWh per month.

1·25 annas per kWh for all in excess of 1,500 kWh per month.

(4) *Minimum Payment.* The minimum payment shall be reckoned annually at Rs 36 per BHP per year, without prejudice to any minimum guaranteed revenue which may be prescribed in special cases.

(5) *Payment.* The above rates are net. In the event that the monthly bill is not paid within the period specified on the bill, a surcharge of 2 per cent shall be levied for each 30 days successive period or part thereof until the amount is paid in full.

(6) *Factory Lighting.* For lighting of the pump room and/or work room the consumption of lamp points not exceeding total of 100 watts will be permitted under this tariff.

41. Schedule C.S.—Commercial Supply—

(1) *Availability.* Available for lights, fans, appliances and small motors for demands up to 10 kW to all non-residential premises, such as business houses, small workshops, pumps, cinemas, clubs, public offices, schools, hospitals, hotels, etc. Re-sale and sub-metering to tenants, adjoining houses and to other parties is strictly prohibited except with the permission of the supplier, in which case the first and the second blocks of the tariff shall be suitably compounded.

(2) *Character of Service.* A.C. 50 cycles, single-phase, 230 V for demands up to 3 kW and 3-phase, 400V for demands from 3 kW to 10 kW.

(3) *Tariff—*

Table XXI—Detailed Schedule for Commercial Supply

5·25 annas per kWh for the first 30 kWh per month

2·25 annas per kWh for the next 50 kWh per month

1·75 annas per kWh for all in excess of 80 kWh per month

Subject to a rebate of 0·25 anna per kWh, provided the monthly bill is paid in full within the time specified on the bill.

(4) *Monthly Minimum Payment.* The monthly minimum payment shall be Rs 2 for the first 1 kW of connected load and Rs 1-8-0 for each additional kW of connected load or part thereof.

42. *Schedule D.S.—Domestic Supply—*

(1) *Availability.* Available to single private houses or flats for lights, fans, domestic pump sets and household appliances for demands up to 3 kW. Private dwellings in which space is occasionally used for the conduct of business by a person residing therein shall also be served under this tariff. Where a portion of the dwelling is used regularly for the conduct of a business, the consumption in that portion will be separately metered and billed under the appropriate Commercial or Industrial Power Tariffs; if separate circuits are not provided, the entire supply will be classified under the Commercial Supply.

Resale and sub-metering to tenants, other flats or households and other parties is strictly prohibited except with the permission of the supplier, in which cases the first and the second blocks of the tariff shall be suitably compounded.

(2) *Character of Service.* A.C. 50 cycles, single-phase, 230V.

(3) *Tariff—*

Table XXII—Detailed Schedule for Domestic Supply

5.25 annas per kWh for the first 15 kWh per month.

2.25 annas per kWh for the next 25 kWh per month.

1.25 annas per kWh for all in excess of 40 kWh per month.

Subject to a rebate of 0.25 annas per kWh, provided the monthly bill is paid in full within the time specified on the bill.

(4) *Monthly Minimum Payment.* The monthly minimum payment shall be Rs 1-8-0 for the first 1kW of connected load and Re 1 for each additional 1kW of connected load or part thereof.

43. *Schedule S.L.—Street Lighting Supply—*

(1) *Availability.* Available for street lighting systems including signal systems and road and park lighting in municipalities, panchayats, etc.

(2) *Character of Service.* A.C. 50-cycles, 3-phase, 400/230V.

(3) *Tariff—*

Table XXIII—Detailed Schedule for Street Lighting Supply

(a) Line maintenance and lamp renewal charges

(i) for lamps of up to 40 watts .. Rs 1-8-0 per lamp per month

(ii) for lamps of 60 and 75

watts

.. Rs 1-12-0 per lamp per month

(iii) for lamps of 100 watts Rs 2 per lamp per month

(iv) for lamps of above 100 watts

and special lamps

.. Special quotations

plus

(b) Energy charges based on metered supply at 2.25 annas per kWh

(4) *Payment.* The above rates are net. In the event of the monthly bill not being paid in full within the time specified on the bill, a surcharge of 1 per cent shall be levied for each 30 days successive period or part thereof until the amount is paid in full.

44. *Schedule B.S.—Bulk Supply to Distributing Licensees—*

(1) *Availability* Available as primary power to distributing licensees for re-sale to ultimate consumers.

(2) *Character of Service.* A.C. 50 cycles, 3-phase, 11,000V or at the option of the supplier at 400V.

(3) *Tariff*—**Table XXIV—Detailed Schedule for Bulk Supply to Licensees***Demand Charge*—

Rs 5-8-0 per kVA per month
plus

Energy Charge—

0·70 annas per kWh for the first 10,000 kWh per month.
0·65 anna per kWh for the next 20,000 kWh per month.
0·60 anna per kWh for all in excess of 30,000 kWh per month.

Subject to an overall maximum of 1·25 annas per kWh without prejudice to the minimum monthly payment under item (5) below.

Note. The above tariff covers supply at 11,000V and a surcharge of 7½ per cent will be levied if the supply is given at 40·V.

(4) *Demand Assessment.* (a) The demand charge shall be based on—

(i) the actual maximum demand during the month; or

(ii) 75 per cent of the highest maximum demand during the preceding 11 months; or

(iii) 50 per cent of the contract demand,
whichever is the highest:

Provided that for the first 11 months from the commencement of supply, alternative (ii) shall not be applicable.

(b) For loads below 250 kVA, the supplier shall reserve the right to measure the maximum demand in kilowatts and charge for it at Rs 6 per kW per month for supply at 11,000V. In this case, if the consumer's power factor is lower than 85 per cent the demand shall, at supplier's option, be defined as 85 per cent of the highest average kilovolt-amperes measured during any 30 consecutive minutes period of the month.

(5) *Monthly Minimum Payment.* The monthly minimum payment shall be limited to the demand charge in (4) above.

(6) *Payment.* The above rates are net. In the event that the monthly bill is not paid in full within the time specified on the bill, a surcharge of 1 per cent shall be levied for each 30 days successive period or part thereof until the amount is paid in full.

(7) *Single Point Delivery.* The above tariff is based on the supply being given through a single delivery and metering point and at a single voltage. Supply at other points or at other voltages shall be separately metered and billed.

CHAPTER VI**FINANCIAL RESULTS**

45. We would like to make clear at the outset of this chapter that Scope of this Chapter. the data and conclusions in it, in so far as they relate to financial returns are the responsibility of the representatives of the State Governments on the Committee. The reasons for this limitation is that the Project Estimate has not yet been finally approved. Important basic decisions have still to be made by the Bhakra Control Board in consultation with the Central Government. An example of the kind of problem is that decision regarding when and how many units are to be installed at Bhakra Dam has not been made,

and is being examined by a Committee set up by the Central Government. In other directions, it has been necessary to make certain exemptions. For example, the load development forecast has been carried forward for a period of twenty years, even though the Central Water and Power Commission's forecast ends at a ten year period. We have, nevertheless, considered it useful to give in this report a financial picture, so as to assist the State Governments in their deliberations. This financial picture is based on figures and assumptions supplied by the Punjab Government representatives on the Committee, and represents their assessment of the likely position on present indications.

The Committee has already defined at Chapter III the main considerations on which the proposed tariffs are based. An attempt has been made to assess tariffs on a practical basis, taking into consideration particularly the need for the fastest load development, in the interests of both the consumer and the Project itself and also testing these to some extent, against the actual capital invested and operation costs. In this chapter we propose to show the results of applying the proposed tariffs in the way of financial returns from the Project. Three sets of data, viz., (1) gross revenue, (2) expenditure, and (3) returns, are worked out, and presented in the form of detailed appendices. In presenting this data separate figures have been given for (a) the "Common Pool", (b) the Punjab, (c) Pepsu, and (d) Rajasthan. Although the working of the "Common Pool" is thus shown separately, and forms the first stage of power supply, its results, whether in profit or loss, are shared by the three participating States in proportion to their share of the Stored Water Supply. It has, therefore, been necessary to take into consideration the respective shares of the three partners from the "Common Pool", and then assess the overall result for each State.

Since a specific term of reference is the consideration of tariffs for the Uhl River System, and since it is essential for overall reasons to treat the two systems as a combined unit, assisting and supporting each other financial results have also been worked out for the Uhl River Project as an independent unit, and also in combination with the Bhakra-Nanga Project.

46. It is necessary to define clearly the more important basic data on which financial returns have been based.

Basic Assumptions for Financial Returns.

(1) In determining financial returns the degree of load development, the extent of capital investment, and the working expenses are fundamental basis for any calculation. Unfortunately, at the present stage of development it is not possible to come to final figures in regard to any of these items. In these circumstances, the data furnished by the Chief Engineer, Electricity, Punjab, has been used in most cases, and rational assumptions have been made in regard to certain items, such as operating expenses, depreciation charges, etc. To the extent that the data is not final, the conclusions are also not final.

(2) A period of 20 years' working has been covered in the financial statements, as for a Project of the magnitude of Bhakra-Nangal, it is only possible to assess returns over a comparatively large number of years.

(3) A forecast of the likely load development has been furnished by the Chief Engineer, Electricity, Punjab and is at Appendix I. The available load data give the demand in kW only, and the energy sales

to various categories of consumers have been estimated by the Committee based on likely group load factors, as in Appendices II, IV, VI and VIII.

(4) Probable revenues have been assessed by applying the over all average rates for energy, as derived from the tariffs proposed, in this report. In addition to the revenue from the sale of energy, miscellaneous income from items such as meter hire, service rentals, etc., is also included, based on the experience of the Uhl River System. This shows that revenue from these sources is 6 per cent of total revenue.

(5) In regard to annual expenditure, this consists mainly of operation, maintenance and depreciation charges. For assessing operation and maintenance charges assumptions have been made on the basis of the present-day working costs of other large Hydro-Electric Systems of comparable size in India. For the maintenance of Civil Works, figures have been furnished by the Punjab Irrigation Branch. In regard to depreciation, the life periods of plant and equipment suggested in the Electricity (Supply) Act, 1948, have been used for calculating the rates of depreciation, with improvement at 3 per cent per annum compound interest. On this basis, the average rates of depreciation are as follows:—

Table XXV—Rates of Depreciation assumed

	Per cent	
Production (Civil Works)	1.33	of the capital cost per annum
Production (Electrical Works)	1.87	Ditto
Transmission	2.09	Ditto
Distribution	2.70	Ditto
Bulk Supply	2.50	Ditto



The charges for the use of water, payable by Electricity to Irrigation have been included, its operating cost, as it will be recalled from paragraph 11 that the capital cost of Civil Works common to Electricity and Irrigation are not shown as debited to the Electricity Project.

(6) In regard to capital cost, figures from the latest Revised Project Estimate, amended on the basis of decisions so far made, have been included. The capital expenditure for each year from the period 1955-56 to 1973-74 is shown at Appendices III, V, VII, IX and X.

(7) The "Sum at Charge", on the basis of which percentage productivity returns have been worked out, includes the total capital cost as well as accumulated arrears of interest.

(8) In accordance with the decision of the Bhakra Control Board, for the purpose of assessing the productivity of the Project, the rate of interest has been assumed at 4.25 per cent.

47. The annual results of the various States showing (1) the results Financial Results. from their own retail supply. (2) the results from their portion of the "Common Pool", and (3) the results from the combination from their share in the "Common

Pool" and retail supply, are shown in Appendices III, V, VII, IX and X. Table XXVI below summarises the position:—

Table XXVI—Financial Returns from the Project

Serial No.	Year of Operation	Common Pool	ON THE BASIS OF RETAIL SALES ONLY			RETAIL SALES plus SHARE OF COMMON POOL			Project as a whole
			Punjab	Pepsu	Rajasthan	Punjab	Pepsu	Rajasthan	
Col.	1	2	3	4	5	6	7	8	9
1	1955-56 ..	1.14	1.62	1.25	-0.87	1.29	1.18	0.23	1.07
2	1956-57 ..	1.72	1.36	1.40	-1.26	1.61	1.61	0.26	1.35
3	1957-58 ..	2.20	1.99	1.76	-1.48	2.17	2.03	0.31	1.76
4	1958-59 ..	2.64	2.39	2.23	-1.52	2.55	2.48	0.40	2.12
5	1959-60 ..	3.68	2.32	2.50	-1.48	2.56	2.61	0.42	2.13
6	1960-61 ..	3.96	2.40	2.64	-1.42	2.76	2.83	0.49	2.31
7	1961-62 ..	3.15	2.51	2.69	-1.38	2.92	2.96	0.54	2.42
8	1962-63 ..	3.26	2.62	2.66	-1.29	3.02	3.01	0.60	2.52
9	1963-64 ..	3.97	2.87	2.67	-1.17	3.55	3.42	0.90	2.96
10	1964-65 ..	4.20	3.12	2.99	-1.04	3.65	3.67	1.00	3.15
11	1965-66 ..	4.43	3.30	3.22	-0.95	3.97	3.90	1.07	3.32
12	1966-67 ..	4.57	3.31	3.25	-0.86	4.06	3.98	1.10	3.38
13	1967-68 ..	4.69	3.29	3.28	-0.83	4.10	4.05	1.13	3.40
14	1968-69 ..	4.81	3.25	3.33	-0.68	4.15	4.13	1.15	4.46
15	1969-70 ..	4.95	3.22	3.35	-0.62	4.21	4.20	1.16	3.48
16	1970-71 ..	5.73	3.19	3.37	-0.56	4.61	4.60	1.36	3.84
17	1971-72 ..	5.94	3.16	3.38	-0.51	4.70	4.69	1.37	3.86
18	1972-73 ..	6.16	3.12	3.39	-0.43	4.76	4.78	1.40	3.92
19	1973-74 ..	6.40	3.09	3.39	-0.39	4.87	4.86	1.40	3.95

It will be seen that the "Common Pool", on the basis of a profit of 4.25 per cent, will yield an adequate return in the year 1965-66 (4.43 per cent), while the States of Punjab and Pepsu will get to the productive level in the year 1970-71, with the percentage return of 4.61 per cent and 4.60 per cent, respectively. The State of Rajasthan, however, will yield a return of only 1.40 per cent in the year 1973-74.

48. The existing schedule of tariffs on the Uhl River System are shown at Appendix XI. These tariffs were designed at the commencement of supply from this System in 1933, and were continued till 1951, except that the tariff for industrial supply was slightly increased in the year 1943. In 1951 some of the other schedules were also increased by levying a surcharge of 12½ per cent. The general supply tariff from the Uhl River System, which covered a wide range of consumption for lighting and other purposes, did not provide any direct incentive for the larger use of energy for domestic and commercial heating, cooking, etc. In order to remedy this, recently a tariff described as "The All Electric Home Tariff" was introduced as an experimental measure in Jullundur. The Committee have carefully

examined this tariff in considering their proposals for domestic and commercial tariffs, and have come to the conclusion that the A.E.H. Tariff will not be satisfactory, in view of the fact that the connected load is the chief element in determining the actual rate payable. It is also susceptible to abuse, and it is, therefore, recommended that the A.E.H. Tariff should be abandoned, and the tariffs proposed in this Report applied to the Uhl River System.

The bulk supply tariff for licensees was also increased by 12½ per cent for the Uhl River System. In the interests of uniformity, here also it is recommended that the tariffs proposed in this Report should be extended to licensees from the Uhl River System.

The industrial tariff of the Uhl River System was not revised after 1943. After careful examination the Committee consider that there is some scope for increase, and that this is also justified in view of the increase in operation and maintenance charges. Here also, therefore, it seems that we are on good ground in recommending the tariffs of this Report for the the Uhl River System.

The Committee again reiterate its view that there should be identical tariffs for the Bhakra-Nangal and Uhl River Schemes, and that the tariffs proposed here should be introduced in advance for the Uhl River System. The Committee is quite convinced that even though separate accounts may be maintained for the Nangal and Uhl River Systems, there are overwhelming advantages in adopting a common policy and practice for these two Systems.

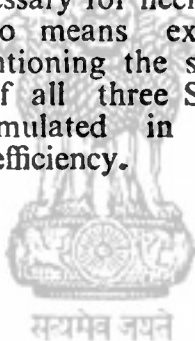
49. It is understood that when the Nangal Project starts functioning a part of the area at present served by the Uhl River System will be transferred to it. This will affect the financial returns of the Uhl River System. The power sale and revenue data for this System for the year 1950-51, 1951-52 and 1952-53 are shown at Appendix XII. The anticipated gross revenues from the Uhl River System for future years are shown at Appendix XIII, which takes into account the reduced area of supply attached to this System. Estimated financial returns for the years 1950-51 to 1973-74 are shown at Appendix XIV. It will be seen that the Uhl River System showed a return of 11 per cent in the year 1952-53, and on the basis of Budget Estimates is to show a return of 9.67 per cent for the year 1953-54. These returns will be slightly lower in the future years. The combined results of the Uhl River System and the Nangal System are shown at Appendix XV. These results tend to a figure intermediate between the present returns of the Uhl River System and the somewhat lower anticipated returns from the Nangal Project.

50. The Committee has considered the *prima facie* slow rate of improvement in returns, in the light of the tariffs recommended by it, and has come to the conclusion that it will not be in the overall interest of power development, or indeed of the Project, to make any further increase in the rate levels. In fact, it is doubtful whether there would be any substantial increase in revenues by raising tariffs, as this might well have the effect of reducing the volume of sales and retarding the growth of load. The Committee would, for these reasons, and also because it is most important that there should be some degree of certainty and continuity in tariffs, so that all the interests concerned know exactly where they stand, recommend most strongly that the tariffs recommended in this Report should be deemed as pitched at the highest practicable level, and should, normally not, be increased at least for a period of five years.

51. Though it is outside their terms of reference, the Committee feel justified in making passing reference to the great importance of formulating a policy for load development, and taking the necessary steps to see that such policy is actually enforced. In this connection, the

Committee would like to draw attention, to the various recommendations made by the Sub-Committee set up by the Punjab Government to consider ways and means for the utilization of electric power from the Bhakra-Nangal Project. This Committee reported on the 27th January 1951. Some of the more important recommendations are recapitulated below:—

- (1) Publicity and propaganda,
- (2) Attractive Tariffs,
- (3) Financial assistance to prospective consumers in the form of—
 - (a) a mill conversion fund,
 - (b) assisted wiring,
 - (c) the hire-purchase system.
- (4) Special facilities to be afforded for rural electrification, including cottage industries,
- (5) The setting up of a State Finance Corporation,
- (6) The setting up of a strong sales and commercial organization, and
- (7) Government should also consider the extent to which financial assistance is necessary for licensed undertakings. The above items are by no means exhaustive. The Committee's intention in mentioning the subject is to bring it to the pointed notice of all three State Governments, so that plans are formulated in good time and enforced with speed and efficiency.



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BHAKRA-NANGAL POWER PROJECT

Statement of Load Forecast for the Uhl River and the Bhakra-Nangal Systems

(All figures of load are in KW)

APPENDIX I

[Referred to in paragraphs 10 and 46 (3) of the Report]

Serial No.	Year of Operation	1954-55 1st	1955-56 2nd	1956-57 3rd	1957-58 4th	1958-59 5th	1959-60 6th	1960-61 7th	1961-62 8th	1962-63 9th	1963-64 10th
1	Punjab— (a) Areas to be served by Uhl River (excluding Rajasthan) (b) Areas to be served by Nangal (c) Bhakra Dam Construction (d) Total	12,000 20,700 4,500	12,636 29,875 4,500	13,433 35,295 5,000	14,193 48,419 5,500	15,343 51,942 6,000	16,226 55,096 ..	16,953 61,375 ..	17,515 65,730 ..	18,005 69,558 ..	18,580 73,578 ..
2	(e) Maximum Demand after applying diversity factor of 1.1	33,800	42,700	48,800	61,900	66,620	64,800	71,200	75,700	79,600	83,800
3	Himachal Pradesh and Bilaspur	300	360	430	510	570	630	670	710	750	750
4	Pepsu (including two Cement Factories)	5,950	10,895	17,245	19,390	21,960	23,520	24,795	25,815	26,710	27,505
5	Rajasthan	3,000	3,600	3,900	4,200	4,500	4,800	5,100	5,400	5,700	6,000
6	Delhi	10,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
7	Uttar Pradesh	..	5,000	6,000	7,000	8,000	9,000	10,000	10,000	10,000	10,000
8	Pakistan	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
9	Total	58,050	87,655	101,375	118,000	126,650	127,750	136,765	142,625	147,760	163,095
10	Maximum Demand after applying a diversity factor of 1.1	52,800	79,670	92,200	107,300	115,100	116,100	124,300	129,700	134,300	148,300
11	Power available from the Uhl River System	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000
12	Net Demand on the Bhakra-Nangal System	19,800	46,600	59,200	74,300	82,100	83,100	91,300	96,700	101,300	115,300
13	Power available from the Bhakra-Nangal System	24,000	70,000	70,000	70,000	125,000	125,000	125,000	125,000	125,000	125,000

* During this year (1957-58) when the total demand on the system exceeds the generating capacity, advantage will be taken of the Delhi Thermal Plant to take its own load partially during peak load periods.

BHAKRA-NANGAL POWER PROJECT

Statement of Load Forecast for the Uhl River and the Bhakra-Nangal Systems

APPENDIX I—CONCLD

[Referred to in paragraphs 10 and 46 (3) of the Report]

(All figures of load are in kW)

Serial No.	Year of Operation	1964-65 11th	1965-66 12th	1966-67 13th	1967-68 14th	1968-69 15th	1969-70 16th	1970-71 17th	1971-72 18th	1972-73 19th	1973-74 20th
1	Punjab— (a) Areas to be served by Uhl River (excluding Pakistan) (b) Areas to be served by Nangal (c) Bhakra Dam Construction (d) Total	18,902 77,656 .. 96,558	19,500 80,000 .. 99,500	20,000 81,000 .. 101,000	20,000 82,000 .. 102,000	21,500 83,000 .. 104,000	21,500 84,000 .. 105,500	22,000 85,000 .. 107,000	22,500 86,000 .. 108,500	23,000 87,000 .. 110,000	23,500 88,000 .. 111,500
(e) Maximum Demand after applying diversity factor of 1.1		87,780	90,500	91,800	93,200	94,500	95,900	97,300	98,600	100,000	101,400
2	Himachal Pradesh and Bilaspur	840	870	900	900	900	900	900	900	900	900
3	Pepsu (including two Cement Factorities)	30,015	30,500	31,000	31,500	32,000	32,500	33,000	33,500	34,000	34,500
4	Rajasthan	6,300	6,600	6,900	7,200	7,500	7,800	8,100	8,400	8,700	9,000
5	Delhi	30,000	30,500	30,000	30,000	30,000	30,000	40,000	40,000	40,000	40,000
6	Uttar Pradesh	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
7	Pakistan	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
8	Total	169,935	173,470	175,600	177,800	179,900	182,100	184,300	186,400	188,500	190,600
9	Maximum Demand after applying a diversity factor of 1.1	154,500	157,700	159,600	161,600	163,500	165,600	167,600	169,600	171,600	173,600
10	Power available from the Uhl River System	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000
11	Net Demand on the Bhakra-Nangal System	121,500	124,700	126,600	128,600	130,500	132,600	134,600	136,600	138,600	140,600
12	Power available from the Bhakra-Nangal System	125,000	128,000	130,000	132,000	134,000	136,000	138,000	140,000	142,000	144,000

THIKRA-NANGAL POWER PROJECT

Commercial Data (Power Sales and Revenues) of Common Pool

APPENDIX II

[Referred to in paragraph 46 (3) of the Report]

Year of Operation	Year	MAXIMUM DEMAND AND KWH ON WHICH GROSS REVENUE HAS BEEN CALCULATED										POWER TO BE PURCHASED FROM U.P. RIVER SYSTEM				INCOME TO COMMON POOL (IN LACS OF RUPIES)								SHARE OF EACH STATE IN THE NET REVENUE			
		Delhi		U.P.		Bhakra Dam Const.		Punjab including H.P. and Bhakra R.		Pepsu		Rajasthan		M.D. (KW)	KWH (in million)	D.I.	U.P.	Bhakra Dam Const.	Punjab including H.P. and Bhakra R.	Pepsu	Rajasthan	Total	Working Expenses including cost of power purchased from the U.P. River System	Net Revenue (Col. No. 24) minus Col. No. 24)	Punjab at 62.36 per cent	Punjab at 22.42 per cent	Rajasthan at 15.22 per cent
		M.D. (KW)	KWH (in million)	M.D. (KW)	KWH (in million)	M.D. (KW)	KWH (in million)	M.D. (KW)	KWH (in million)	M.D. (KW)	KWH (in million)	M.D. (KW)	KWH (in million)														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1st	1954-55	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2nd	1955-56	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3rd	1956-57	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4th	1957-58	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5th	1958-59	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6th	1959-60	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7th	1960-61	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8th	1961-62	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9th	1962-63	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10th	1963-64	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
11th	1964-65	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12th	1965-66	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13th	1966-67	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14th	1967-68	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15th	1968-69	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16th	1969-70	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17th	1970-71	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
18th	1971-72	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19th	1972-73	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20th	1973-74	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

BHAKRA-NANGAL POWER PROJECT

Financial Returns of Common Pool

APPENDIX III
(Referred to in paragraphs 46 (6) and 47 of the Report)

Year of operation	Year	CAPITAL OUTLAY (DIRECT AND INDIRECT) UP TO THE END OF THE YEAR				Interest during the year	Net Revenue during the year	Total sum at charge up to the end of the year	Percentage Return
		Pen. (Civil Works)	Production (Elec. and W. & S.)	Transmission	Total				
1	2	3	4	5	6	7	8	9	10
Construction period	31-3-51	43.54	—0.27	68.95	112.22			112.22	
	1951-52	108.29	288.88	307.28	704.45	12.46		716.91	
	1952-53	373.02	341.27	451.31	1,165.60	35.17		1,213.23	
	1953-54	613.83	496.97	662.49	1,803.29	59.81		1,910.73	
	1954-55	752.93	634.44	941.48	2,328.85	86.84	—3.31	2,526.44	—0.13
1st	1955-56	861.03	745.30	1,048.73	2,656.06	108.63	33.50	2,928.78	1.14
2nd	1956-57	932.21	836.16	1,127.77	2,936.14	124.60	56.48	3,276.98	1.72
3rd	1957-58	932.21	911.59	1,127.77	2,991.57	134.56	74.73	3,392.24	2.20
4th	1958-59	932.21	950.11	1,127.77	3,030.09	139.08	91.97	3,477.87	2.64
5th	1959-60	932.21	1,002.61	1,127.77	3,082.59	143.00	95.93	3,577.44	2.68
6th	1960-61	932.21	1,002.61	1,160.29	3,115.11	146.79	108.03	3,648.72	2.96
7th	1961-62	932.21	1,055.11	1,181.97	3,189.29	150.68	118.25	3,755.33	3.15
8th	1962-63	932.21	1,107.61	1,203.65	3,263.47	155.19	125.91	3,858.79	3.26
9th	1963-64	932.21	1,107.61	1,225.33	3,285.15	158.45	154.27	3,884.65	3.97
10th	1964-65	932.21	1,107.61	1,225.33	3,285.15	159.08	163.11	3,880.62	4.20
11th	1965-66	932.21	1,107.61	1,225.33	3,285.15	158.91	171.27	3,868.26	4.43
12th	1966-67	932.21	1,107.61	1,225.33	3,285.15	158.39	175.95	3,850.70	4.57
13th	1967-68	932.21	1,107.61	1,225.33	3,285.15	157.64	179.43	3,828.91	4.69
14th	1968-69	932.21	1,107.61	1,225.33	3,285.15	156.71	183.06	3,802.56	4.81
15th	1969-70	932.21	1,107.61	1,225.33	3,285.15	155.59	186.61	3,771.54	4.95
16th	1970-71	932.21	1,107.61	1,225.33	3,285.15	154.28	212.81	3,713.01	5.73
17th	1971-72	932.21	1,107.61	1,225.33	3,285.15	151.79	216.54	3,648.26	5.94
18th	1972-73	932.21	1,107.61	1,225.33	3,285.15	149.04	220.35	3,576.95	6.16
19th	1973-74	932.21	1,107.61	1,225.33	3,285.15	146.01	223.97	3,498.99	6.40
20th									

BHAKRA-NANGAL POWER PROJECT

Commercial Data (Power Sales and Revenue) of State of Punjab

APPENDIX IV (Referred to in paragraph 46 (3) of the Report)

Year of operation	Year	Max. Demand at the Grid for the year (kW)	Total kWh purchased at the Grid (in Million)	Max. Demand and consumers terminals for the year (kW)	UNITS SOLD IN MILLIONS				Total*	General and Street Lighting at an average rate of 3 annas per kWh sold	Small and Medium Industry at an average rate of 1.4 annas per kWh sold	Large Industry at an average rate of 9 pies per kWh sold	Bulk supply at an average rate of 1.02 annas per kWh sold	Total Gross Revenue	Miscellaneous Receipts at 6 per cent on Col. 15	Total Gross Revenue Col. 15 + Col. 15	Annual Working expenses	Net Revenue Col. 17 - Col. 18
					General and Street Lighting	Small and Medium Industry	Large Industry	Bulk Supply										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1st	1954-55	18,290	..	16,600	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2nd	1955-56	26,340	97.74	24,000	8.89	40.02	26.67	13.33	88.91	16.67	35.01	12.50	8.51	72.69	4.36	77.05	63.96	13.09
3rd	1956-57	31,000	125.57	28,200	11.43	51.46	34.29	17.14	114.32	21.43	45.01	16.08	10.93	93.45	5.61	99.06	85.87	13.19
4th	1957-58	42,490	160.94	38,630	14.63	65.83	43.89	21.94	146.29	27.43	57.60	20.57	13.99	119.59	7.18	126.77	105.90	20.87
5th	1958-59	45,540	192.79	41,400	17.52	78.84	52.56	26.28	175.20	32.85	68.99	24.64	16.75	143.23	8.56	151.79	123.62	28.17
6th	1959-60	48,600	206.17	44,200	18.75	84.34	56.25	28.12	187.46	35.15	73.81	26.36	17.93	153.25	9.20	162.45	133.21	29.24
7th	1960-61	53,740	224.12	48,900	20.29	91.75	61.17	30.58	203.89	38.23	80.28	28.87	19.50	166.68	10.00	176.68	144.19	32.49
8th	1961-62	57,680	244.01	52,400	22.19	99.81	66.57	33.28	221.85	41.60	87.35	31.20	21.21	181.36	10.88	192.24	155.98	36.26
9th	1962-63	60,900	259.69	55,400	23.61	106.23	70.83	35.41	236.08	44.27	92.96	33.20	22.57	193.00	11.58	204.58	165.22	39.36
10th	1963-64	64,450	274.52	58,600	24.97	112.33	74.91	37.45	249.66	46.81	98.30	35.12	23.87	204.10	12.25	216.35	172.69	43.66
11th	1964-65	68,000	290.07	62,000	26.41	118.86	79.23	39.61	264.11	49.52	103.99	37.14	25.26	215.91	12.95	228.86	179.84	49.02
12th	1965-66	70,030	302.29	63,700	27.53	123.87	82.59	41.29	275.28	51.62	108.39	38.71	26.32	225.04	13.50	238.54	185.64	52.90
13th	1966-67	70,960	308.77	64,500	28.08	126.32	84.24	42.12	280.76	52.64	110.55	39.48	26.85	229.52	13.77	243.29	189.06	54.23
14th	1967-68	71,860	312.78	65,300	28.43	127.90	85.29	42.64	284.26	53.30	111.93	39.97	27.18	232.38	13.94	246.32	191.47	54.85
15th	1968-69	72,760	316.72	66,100	28.78	129.48	86.34	43.17	287.77	53.96	113.30	40.47	27.52	235.25	14.12	249.37	193.85	55.52
16th	1969-70	73,560	320.44	66,900	29.13	131.06	87.39	43.69	291.27	54.62	114.68	40.96	27.85	238.11	14.29	252.40	196.13	56.27
17th	1970-71	74,460	324.16	67,700	29.48	132.64	88.44	44.21	294.77	55.28	116.06	41.46	28.18	240.98	14.46	255.44	198.42	57.02
18th	1971-72	75,360	328.11	68,500	29.83	134.22	89.49	44.74	298.28	55.93	117.44	41.94	28.53	243.84	14.63	258.47	200.50	57.67
19th	1972-73	76,260	332.05	69,300	30.18	135.79	90.54	45.27	301.78	56.59	118.81	42.44	28.87	246.71	14.80	261.51	203.18	58.33
20th	1973-74	77,060	335.77	70,100	30.52	137.39	91.59	45.78	305.29	57.24	120.21	42.94	29.18	249.57	14.97	264.54	205.46	59.08

* (Col. 5) Units sold have been calculated on the Maximum Demand at the beginning of the year plus half of the Maximum Demand during the year.

BHAKRA-NANGAL POWER PROJECT
Financial Returns of State of Punjab

APPENDIX V
(Referred to in paragraphs 46 (6) and 47 of the Report)

STATES OWN (EXCLUSIVE OF THE SHARE OF COMMON POOL)										PRO-RATA SHARE OF PUNJAB IN COMMON POOL					PUNJAB STATE (INCLUSIVE OF THE SHARE OF COMMON POOL)				
Year of operation	Capital Outlay (Direct and Indirect upto the end of the year)					Interest during the year	Net Revenue during the year	Sum at charge up to the end of the year	Percentage Return	Capital Outlay Direct and Indirect upto the end of the year	Interest during the year	Net Revenue during the year	Sum at charge up to the end of the year	Percentage Return	Total Capital Outlay (Direct and Indirect upto the end of the year)	Total Net Revenue during the year	Total sum at charge up to the end of the year	Percentage Return	
	Transmission (66 kV and above)	Transmission below 66 kV	Distribution	Bulk	Total														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Construction period	31-3-51	60.08	60.08	..	60.08	..	60.08	..
	1951-52	34.15	56.94	2.02	0.13	98.24	1.98	..	95.22	..	439.30	7.77	..	447.07	..	532.54	..	542.29	..
	1952-53	58.37	107.76	10.39	0.17	176.69	5.79	..	184.46	..	726.87	21.93	..	756.57	..	903.56	..	941.03	..
	1953-54	81.83	166.46	44.63	0.17	293.09	10.22	..	311.08	..	1,124.54	37.29	..	1,191.53	..	1,417.63	..	1,502.61	..
	1954-55	136.54	220.33	94.76	2.43	454.06	16.49	0.50	488.04	0.10	1,452.28	54.15	-2.06	1,575.48	-0.13	1,906.34	-1.56	2,063.52	-0.08
	1955-56	191.00	273.96	291.42	5.82	762.20	27.07	13.09	810.16	1.62	1,656.33	67.74	20.89	1,826.38	1.14	2,418.53	33.98	2,636.54	1.29
	1956-57	202.84	320.40	373.02	6.08	902.34	37.29	13.19	974.40	1.36	1,830.99	77.70	35.22	2,043.52	1.72	2,733.33	48.41	3,017.92	1.61
	1957-58	202.84	320.40	454.62	6.30	984.16	43.22	20.87	1,078.57	1.99	1,885.55	83.91	46.60	2,115.39	2.20	2,849.71	67.47	3,193.96	2.17
	1958-59	202.84	320.40	535.22	6.30	1,064.76	47.90	28.17	1,178.90	2.39	1,889.57	86.73	57.35	2,168.79	2.64	2,954.33	85.52	3,347.69	2.55
	1959-60	202.84	320.40	598.82	6.30	1,128.36	52.13	29.24	1,265.39	2.32	1,922.31	89.18	59.82	2,230.89	2.68	3,050.67	89.06	3,496.28	2.56
1960-61	202.84	320.40	662.37	6.30	1,191.91	56.17	32.49	1,352.62	2.40	1,942.59	91.54	67.37	2,275.34	2.96	3,134.50	99.86	3,627.96	2.76	
1961-62	202.84	320.40	725.91	6.30	1,255.45	60.17	36.26	1,440.07	2.51	1,988.85	93.97	73.74	2,341.83	3.15	3,244.30	110.00	3,781.90	2.92	
1962-63	202.84	320.40	761.61	6.30	1,291.15	63.83	39.36	1,500.24	2.62	2,035.10	96.77	78.52	2,406.33	3.26	3,326.25	117.88	3,906.57	3.02	
1963-64	202.84	320.40	774.85	6.30	1,304.39	66.38	43.66	1,536.20	2.85	2,048.62	98.81	96.20	2,422.46	3.97	3,353.01	139.86	3,958.66	3.55	
1964-65	202.84	324.74	785.95	6.30	1,319.83	68.47	49.02	1,571.09	3.12	2,048.62	99.20	101.71	2,419.95	4.20	3,368.45	145.73	3,991.04	3.65	
1965-66	202.84	329.08	797.05	6.30	1,335.27	70.49	52.90	1,603.92	3.30	2,048.62	99.10	106.80	2,412.25	4.43	3,383.89	159.70	4,016.37	3.97	
1966-67	202.84	333.42	808.15	6.30	1,350.71	72.47	54.23	1,637.80	3.31	2,048.02	98.77	109.72	2,401.30	4.57	3,399.33	163.95	4,039.10	4.06	
1967-68	202.84	337.76	819.25	6.30	1,366.15	74.48	54.85	1,672.87	3.29	2,048.62	98.30	111.89	2,387.71	4.70	3,414.77	166.74	4,060.58	4.10	
1968-69	202.84	312.10	830.35	6.30	1,381.59	76.56	55.52	1,709.35	3.25	2,048.62	97.73	114.16	2,371.28	4.81	3,430.21	169.68	4,080.63	4.15	
1969-70	202.84	346.44	841.45	6.30	1,397.03	78.70	56.27	1,747.22	3.22	2,048.62	97.03	116.37	2,351.94	4.95	3,445.65	172.64	4,099.16	4.21	
1970-71	202.84	350.78	852.65	6.30	1,412.47	80.91	57.02	1,786.55	3.19	2,048.62	96.21	132.71	2,315.44	5.73	3,561.09	189.73	4,101.99	4.61	
1971-72	202.84	355.12	863.65	6.30	1,427.91	83.19	57.67	1,827.51	3.16	2,048.62	94.66	135.03	2,275.07	5.94	3,476.53	192.70	4,102.58	4.70	
1972-73	202.84	359.46	874.75	6.30	1,443.35	85.55	58.33	1,870.17	3.12	2,048.62	92.94	137.41	2,230.60	6.16	3,491.97	195.74	4,100.77	4.76	
1973-74	202.84	363.80	885.85	6.30	1,458.79	87.98	59.08	1,914.51	3.09	2,048.02	91.05	139.67	2,181.98	6.40	3,507.41	198.75	4,096.49	4.87	

Commercial Data (Power Sales and Revenue) of State of Pepsu

(Refer to in paragraph 46 (3) of the Report)

Year	Year of operation	MAXIMUM DEMAND AT GRID		KWH PURCHASED FROM THE GRID		MAXIMUM DEMAND AT CONSUMERS' TERMINALS		KWH SOLD IN MILLIONS						GROSS REVENUE IN LACS OF RUPEES						Total Gross Revenue (in lacs of Rupees)	Total Working Expenses (in lacs of Rupees)	Net Revenue (in Lacs of Rupees)	
		Local distribution at the end of the year (KW)	Cement Factories at the beginning of the year (KW)	For Local Distribution at 50 per cent L. F. of Col. 3 (KW)	For Cement Factories at 70 per cent L. F. of Col. 4 (KW)	Local Distribution at the end of the year 100 of Col. 3 (KW)	Cement Factories at the beginning of the year (KW)	Local Distribution						Local Distribution									
								General and Street Lighting	Small and Medium Industry	Large Industry	Bulk Supply	Total	Cement Factories	General and Street Lighting	Small and Medium Industry	Large Industry	Bulk supply	Cement Factories	Total				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1st	1954-55	Operation for two or three months only.																					
2nd	1955-56	7,030	3,370	24.05	20.65	6,400	3,370	4.38	10.95	4.38	2.19	21.90	20.66	8.21	9.58	2.05	1.40	9.40	20.64	1.55	32.19	28.28	3.91
3rd	1956-57	8,580	7,820	34.19	47.65	7,800	7,820	6.22	13.65	8.12	3.11	31.10	47.65	11.66	11.94	3.67	1.58	21.43	50.68	1.76	52.44	46.70	5.74
4th	1957-58	10,680	7,820	42.18	47.65	9,700	7,820	7.67	19.17	7.66	3.83	38.33	47.65	14.37	16.77	3.59	2.44	21.43	58.60	2.23	60.83	52.50	7.93
5th	1958-59	12,830	8,070	51.49	49.49	11,700	8,070	9.37	23.44	9.37	4.69	46.87	49.49	17.57	20.50	4.39	2.59	22.09	67.54	2.73	70.27	59.23	11.04
6th	1959-60	14,080	8,320	58.93	51.02	12,800	8,320	10.76	26.80	10.76	5.37	53.66	51.02	20.12	23.47	5.03	3.43	22.78	74.83	3.12	77.95	64.61	13.34
7th	1960-61	15,030	8,570	63.75	52.55	13,700	8,570	11.61	29.04	11.59	5.80	58.04	52.55	21.76	25.09	5.44	3.70	23.45	79.74	3.38	83.12	68.41	14.71
8th	1961-62	15,780	8,820	67.47	54.08	14,300	8,820	12.26	30.64	12.29	6.13	61.32	54.08	23.00	26.85	5.75	3.52	24.03	83.53	3.57	87.10	71.41	15.69
9th	1962-63	16,330	9,070	70.32	55.62	14,800	9,070	12.75	31.84	12.77	6.37	63.73	55.62	23.50	27.18	5.57	4.06	24.10	86.61	3.71	90.32	74.05	16.27
10th	1963-64	16,880	9,520	72.64	57.15	15,300	9,520	13.18	32.80	13.35	6.59	65.92	57.15	24.72	28.24	6.18	4.20	25.48	89.42	3.84	93.26	76.36	16.90
11th	1964-65	18,730	9,870	77.99	60.52	17,000	9,870	14.15	35.36	14.16	7.07	70.74	60.52	26.53	30.55	6.63	4.51	26.57	95.59	4.12	99.71	80.37	19.34
12th	1965-66	19,130	9,870	82.91	60.52	17,400	9,870	15.07	37.63	15.06	7.53	75.34	60.52	28.24	32.56	7.06	4.80	26.57	100.03	4.20	104.23	82.79	22.44
13th	1966-67	19,630	9,870	84.88	60.52	17,800	9,870	15.42	38.56	15.40	7.71	77.09	60.52	28.50	33.73	7.23	4.51	26.57	101.74	4.49	106.23	83.97	22.26
14th	1967-68	20,130	9,870	87.07	60.52	18,300	9,870	15.81	39.52	15.82	7.91	79.06	60.52	29.65	34.49	7.41	5.04	26.57	103.06	4.60	108.26	85.26	23.00
15th	1968-69	20,630	9,870	89.26	60.52	18,800	9,870	16.25	39.51	17.37	8.12	81.25	60.52	30.47	34.55	7.02	5.18	26.57	104.79	4.73	109.52	86.52	23.00
16th	1969-70	21,130	9,870	91.45	60.52	19,200	9,870	16.64	40.48	17.78	8.32	83.22	60.52	31.20	35.41	7.80	5.31	26.57	106.09	4.84	111.53	87.81	23.72
17th	1970-71	21,630	9,870	93.94	60.52	19,700	9,870	17.04	41.44	18.15	8.52	85.19	60.52	31.95	36.27	7.58	5.43	26.57	108.00	4.96	113.56	89.08	24.48
18th	1971-72	22,130	9,870	96.83	60.52	20,100	9,870	17.43	42.40	18.61	8.72	87.16	60.52	32.68	37.13	8.16	5.56	26.57	110.50	5.07	115.57	90.37	25.20
19th	1972-73	22,630	9,870	98.02	60.52	20,600	9,870	17.83	43.44	18.55	8.91	89.13	60.52	33.43	37.59	8.24	5.68	26.57	112.41	5.19	117.00	91.64	25.96
20th	1973-74	23,130	9,870	100.21	60.52	21,000	9,870	18.22	44.40	19.37	9.11	91.10	60.52	34.18	38.85	8.52	5.81	26.57	114.53	3.30	119.83	92.93	26.90

BHAKRA-NANGAL POWER PROJECT

Financial Returns of State of Pepsu
(In Lakhs of Rupees)

APPENDIX VII

(Referred to in paragraphs 46 (6) and 47 of the Report)

Year of Operation	Year	STATES OWN (EXCLUSIVE OF THE SHARE OF COMMON POOL)					PRORATA SHARE OF PEPHU IN COMMON POOL					PEPSU STATE (INCLUSIVE OF THE SHARE OF COMMON POOL)							
		Capital Outlay (Direct and Indirect) up to the end of the year					Interest during the year	Net Revenue during the year	Sum at charge up to the end of the year	Percentage Return	Capital Outlay (Direct and Indirect) up to the end of the year	Interest during the year	Net Revenue during the year	Sum at charge to the end of the year	Percentage Return	Total Capital Outlay Direct and Indirect up to the end of the year	Total Net Revenue during the year	Total Sum at charge up to the end of the year	Percentage Return
		Transmission (above 600 K V)	Transmission (below 600 K V)	Distribution	Bulk	Total													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Construction Period	31.3.51	..	..	..	..	..	0.24	..	..	..	25.16	..	..	..	25.16	..	..	25.16	..
	1951-52	..	11.39	..	..	11.39	0.24	..	..	..	137.93	2.79	..	..	160.72	..	169.32	160.72	..
	1952-53	..	23.48	7.26	..	30.76	0.90	..	..	..	261.32	7.89	..	..	272.00	..	292.06	272.00	..
	1953-54	..	35.21	30.71	30.36	1.13	97.41	2.75	..	..	484.29	13.41	..	..	428.38	..	501.70	428.38	..
1st	1954-55	..	57.05	63.37	70.81	2.83	194.06	6.30	..	203.91	0.16	522.12	19.47	—0.74	566.42	—0.13	716.18	770.33	..
2nd	1955-56	..	57.05	63.37	121.32	2.83	291.24	10.68	3.91	307.85	1.55	595.49	24.35	7.51	637.23	1.14	886.73	565.08	1.18
3rd	1956-57	..	79.03	87.42	166.40	3.47	381.97	15.07	5.74	407.50	1.40	638.27	27.54	12.06	734.69	1.72	1,040.24	1,142.59	1.01
4th	1957-58	..	99.57	112.53	200.41	3.47	415.98	18.23	7.93	452.19	1.76	670.71	30.17	16.15	760.55	2.20	1,086.09	1,212.74	2.03
5th	1958-59	..	99.57	112.53	234.42	3.47	449.59	20.33	11.64	495.48	2.33	679.35	31.18	20.61	779.75	2.04	1,129.34	1,275.23	2.48
6th	1959-60	..	99.57	112.53	261.62	3.47	477.00	22.29	13.34	531.64	2.50	691.12	32.06	21.51	802.07	2.08	1,168.32	1,333.71	2.61
7th	1960-61	..	99.57	112.53	277.67	3.47	493.24	23.50	14.71	536.87	2.04	698.40	32.91	24.22	818.04	2.96	1,191.04	1,374.91	2.83
8th	1961-62	..	99.57	112.53	293.21	3.47	508.78	25.29	15.69	582.03	2.69	715.03	33.78	26.51	841.94	3.15	1,223.81	1,423.57	2.56
9th	1962-63	..	99.57	112.53	308.75	3.47	534.32	26.72	16.27	608.07	2.68	731.66	34.79	28.23	865.13	3.26	1,255.98	1,473.20	3.01
10th	1963-64	..	99.57	112.53	321.25	3.47	536.82	28.12	16.50	631.79	2.67	736.52	35.52	34.19	870.92	3.97	1,273.34	1,502.71	3.42
11th	1964-65	..	99.57	114.70	326.80	3.47	544.54	29.42	19.34	649.00	2.59	736.52	35.67	36.57	870.92	4.20	1,281.06	1,519.02	3.07
12th	1965-66	..	99.57	116.87	332.35	3.47	552.26	30.59	22.44	666.45	3.22	736.52	35.63	38.40	867.25	4.38	1,288.78	1,533.70	3.50
13th	1966-67	..	99.57	119.04	337.90	3.47	559.98	31.75	22.26	683.66	3.25	736.52	35.51	39.45	863.31	4.51	1,296.00	1,540.57	3.58
14th	1967-68	..	99.57	121.21	343.45	3.47	567.70	32.93	23.00	701.31	3.28	736.52	35.54	40.23	858.42	4.09	1,304.22	1,559.73	4.05
15th	1968-69	..	99.57	123.38	349.00	3.47	575.42	34.15	23.60	718.98	3.33	736.52	35.13	41.04	852.51	4.81	1,311.94	1,571.70	4.13
16th	1969-70	..	99.57	125.55	354.55	3.47	583.14	35.39	23.72	737.58	3.35	736.52	34.88	41.84	845.55	4.55	1,319.06	1,583.13	4.20
17th	1970-71	..	99.57	127.72	360.10	3.47	590.26	36.06	24.48	756.47	3.37	736.52	34.59	42.71	832.43	5.73	1,327.58	1,598.50	4.00
18th	1971-72	..	99.57	129.89	365.65	3.47	598.58	37.56	25.20	775.93	3.33	736.52	34.03	43.56	817.91	5.94	1,335.10	1,595.84	4.09
19th	1972-73	..	99.57	132.06	371.20	3.47	606.30	39.30	25.96	795.97	3.39	736.52	33.41	44.40	801.92	6.16	1,342.62	1,597.19	4.78
20th	1973-74	..	99.57	134.23	376.75	3.47	614.02	40.68	26.00	816.65	3.39	736.52	32.73	50.21	784.44	6.40	1,350.54	1,601.69	4.86

BHAKRA-NANGAL POWER PROJECT

Commercial Data (Power Sales and Revenue) of State of Rajasthan

APPENDIX VIII

(Ref.rr.d to in paragraph 46(3) of the Report)

Year of operation	Year	MAX. DEMAND (kW)		KWh purchased from Grid (in millions)	KWH SOLD (IN MILLIONS)				General and Street Lighting	Small Industry	Large Industry	Total	Miscellaneous receipt at 6 per cent of Col. 13	Total Gross Revenue	Annual Working Expenses	17 Net Revenue Co. 15—Col. 16	
		At the Grid	At Consumers Terminals		6	7	8	9									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1st ..	1954-55	2,860	2,600	..	3.12	5.62	3.74	12.48	5.85	..	1.75	12.52	..	13.27	16.51	..	..
2nd ..	1955-56	3,430	3,100	13.78	3.56	6.41	4.27	14.24	6.67	5.61	2.00	14.28	0.86	15.14	21.18	..	..
3rd ..	1956-57	3,700	3,400	15.61	3.83	6.90	4.60	15.33	7.19	6.04	2.15	15.38	0.92	16.30	24.36	..	..
4th ..	1957-58	4,000	3,600	16.86	4.11	7.39	4.93	16.43	7.70	6.47	2.30	16.47	0.99	17.46	26.66	..	..
5th ..	1958-59	4,300	3,900	18.18	4.43	7.99	5.32	17.74	8.32	6.98	2.49	17.79	1.07	18.86	28.62	..	..
6th ..	1959-60	4,600	4,200	19.49	4.71	8.47	5.65	18.83	8.83	7.41	2.65	18.89	1.13	20.02	30.27	..	..
7th ..	1960-61	4,800	4,400	20.59	4.93	8.87	5.91	19.71	9.24	7.76	2.77	19.77	1.19	20.96	31.62	..	..
8th ..	1961-62	5,100	4,600	21.68	5.20	9.37	6.24	20.81	9.75	8.20	2.92	20.87	1.25	22.12	32.75	..	..
9th ..	1962-63	5,400	4,900	23.00	5.53	9.95	6.64	22.12	10.37	8.71	3.11	22.19	1.33	23.52	33.76	..	..
10th ..	1963-64	5,700	5,200	24.31	5.86	10.54	7.03	23.43	10.99	9.22	3.30	23.51	1.41	24.92	34.62	..	..
11th ..	1964-65	6,000	5,500	25.62	6.13	11.04	7.36	24.53	11.49	9.66	3.45	24.60	1.48	26.08	35.40	..	..
12th ..	1965-66	6,300	5,700	26.94	6.41	11.52	7.69	25.62	12.00	10.08	3.62	25.70	1.54	27.24	36.18	..	..
13th ..	1966-67	6,600	6,000	28.25	6.74	12.12	8.08	26.94	12.64	10.61	3.77	27.02	1.62	28.64	36.95	..	..
14th ..	1967-68	6,900	6,300	29.57	7.01	12.61	8.41	28.03	13.14	11.03	3.95	28.12	1.69	29.81	37.64	..	..
15th ..	1968-69	7,100	6,500	30.66	7.23	13.01	8.67	28.91	13.56	11.41	4.03	29.00	1.74	30.74	38.34	..	..
16th ..	1969-70	7,400	6,700	31.76	7.50	13.50	9.00	30.00	14.01	11.92	4.17	30.10	1.81	31.91	39.12	..	..
17th ..	1970-71	7,700	7,000	33.07	7.83	14.09	9.40	31.32	14.66	12.30	4.18	31.14	1.87	33.01	39.90	..	..
18th ..	1971-72	8,000	7,300	34.38	8.10	14.59	9.72	32.41	15.19	12.77	4.55	32.51	1.95	34.46	40.67	..	..
19th ..	1972-73	8,300	7,500	35.70	8.38	15.08	10.05	33.51	15.71	13.20	4.70	33.61	2.02	35.63	41.45	..	..
20th ..	1973-74	8,600	7,800	37.01	8.66	15.57	10.32	34.61	16.23	13.71	4.85	34.71	2.09	36.80	42.34	..	..

BHAKRA-NANGAL POWER PROJECT

APPENDIX IX

[Referred to in paragraphs 46 (6) and 47 of the Report]

Financial Returns of State of Rajasthan
(In Lacs of Rupees)

STATES OWN (EXCLUSIVE OF THE SHARE OF COMMON POOL)										PRO-RATA SHARE OF RAJASTHAN IN COMMON POOL					RAJASTHAN STATE (INCLUSIVE OF THE SHARE OF COMMON POOL)				
Year of Operation	Year	Capital Outlay (Direct and Indirect) up to the end of the year				Interest during the year	Net Revenue during the year	Sum at charge up to the end of the year	Percentage Return	Capital and Indirect up to the end of the year	Interest during the year	Net Revenue during the year	Sum at charge up to the end of the year	Percentage Return	Total Capital and Indirect up to the end of the year	Total Net Revenue during the year	Total sum at charge up to the end of the year	Percentage Return	
		Transmission (66 KV and above)	Transmission (below 66 KV)	Distribution	Total														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Construction period	31-3-51	..	..	..	..	..	..	..	..	17.08	..	..	17.08	..	..	..	17.08	..
	1951-52	..	..	..	..	..	..	..	..	107.22	1.90	..	109.12	..	..	..	109.12	..
	1952-53	..	..	..	..	..	..	..	..	177.41	5.35	..	184.66	..	..	..	184.66	..
	1953-54	..	..	..	..	..	..	..	..	274.46	9.10	..	290.81	..	..	..	332.82	..
	1954-55	21.11	..	20.03	41.14	0.87	..	42.01	-0.24	354.45	13.22	-0.51	384.53	-0.13	591.54	-0.87	628.75	-0.14	
	1955-56	137.01	..	50.08	237.09	5.90	-0.58	244.22	-0.87	404.24	16.53	+5.10	445.75	+1.14	751.56	+1.86	816.06	+0.23	
	1956-57	237.09	20.08	90.15	347.32	12.62	-3.24	370.31	-1.26	446.88	18.96	8.60	498.75	1.72	879.80	2.56	978.15	0.26	
	1957-58	232.68	26.70	123.54	432.92	17.45	-6.04	479.40	-1.48	445.31	20.48	11.38	516.28	2.20	921.62	3.32	1,058.12	0.31	
	1958-59	232.68	26.70	156.93	466.31	20.99	-8.06	511.81	-1.52	461.17	21.17	14.00	529.31	2.64	955.31	4.80	1,131.73	0.40	
	1959-60	232.68	26.70	184.76	494.14	23.55	-9.26	602.42	-1.48	469.16	21.76	14.60	544.46	2.68	984.36	4.84	1,203.72	0.42	
	1960-61	232.68	26.70	205.82	515.20	26.02	-9.76	659.26	-1.42	474.12	22.34	16.44	555.32	2.96	1,010.36	6.19	1,274.36	0.49	
	1961-62	232.68	26.70	226.83	556.24	28.47	-10.25	719.04	-1.38	485.41	22.93	18.00	571.54	3.15	1,031.60	7.34	1,341.99	0.54	
	1962-63	232.68	26.70	236.81	545.19	30.82	-10.66	770.45	-1.29	496.71	23.62	19.16	587.30	3.26	1,052.78	8.53	1,411.31	0.60	
	1963-64	232.68	26.70	246.67	666.07	33.05	-10.63	824.01	-1.17	500.01	24.12	23.48	591.24	3.97	1,062.89	13.24	1,467.61	0.90	
	1964-65	232.68	29.98	255.83	567.85	35.31	-9.70	876.37	-1.04	500.01	24.21	24.83	590.62	4.20	1,067.86	15.13	1,519.21	1.00	
	1965-66	232.68	31.62	260.16	577.82	37.55	-9.32	928.59	-0.95	500.01	24.19	26.07	588.74	4.43	1,072.83	16.75	1,571.44	1.07	
	1966-67	232.68	33.26	263.49	577.79	42.18	-8.94	1,038.79	-0.86	500.01	24.11	26.78	586.07	4.57	1,077.80	17.84	1,624.86	1.10	
	1967-68	232.68	34.90	266.82	582.76	44.63	-8.31	996.70	-0.83	500.01	23.99	27.31	582.75	4.68	1,082.77	19.00	1,679.45	1.13	
	1968-69	232.68	36.54	270.15	587.73	47.16	-7.83	1,156.66	-0.68	500.01	23.85	27.86	578.74	4.81	1,087.74	20.03	1,735.40	1.15	
	1969-70	232.68	38.18	273.42	592.70	49.78	-7.66	1,219.01	-0.62	500.01	23.68	28.40	574.02	4.95	1,092.71	20.80	1,793.03	1.16	
1970-71	232.68	39.82	276.81	597.67	52.50	-7.21	1,283.69	-0.56	500.01	23.48	32.39	565.11	5.73	1,097.68	25.18	1,848.80	1.36		
1971-72	232.68	41.46	280.14	602.64	55.32	-6.89	1,350.89	-0.51	500.01	23.10	32.96	555.25	5.93	1,102.65	26.07	1,906.12	1.37		
1972-73	232.68	43.10	283.47	607.61	58.26	-6.21	1,420.31	-0.43	500.01	22.68	33.54	544.39	6.16	1,107.62	27.33	1,964.70	1.40		
1973-74	232.68	43.10	286.80	612.58	61.29	-5.82	1,492.39	-0.39	500.01	22.22	34.09	532.52	6.40	1,112.59	28.27	2,024.91	1.40		

APPENDIX XI

(Sheet No. 1)

(Referred to in paragraph 48 of the Report)

TARIFFS FOR UHL RIVER HYDRO-ELECTRIC SCHEME AS ON 1st JUNE 1953

Schedule of Tariffs for General Supply

TWO—PART TARIFF

Rate No.	Connected load in watts	Demand charges per month	ENERGY CHARGES PER UNIT			
			Gross Rate		Net Rate	
		Rs A. P.	Rs A. P.		Rs A. P.	
1	50 and under	0 2 3	0 5 7		0 4 9	
2	51—100	0 4 6	0 5 7		0 4 6	
3	101—200	0 9 0	0 5 7		0 4 3	
4	201—500	1 2 0	0 4 6		0 3 11	
5	501—1,000	2 4 0	0 4 6		0 3 8	
6	1,001—2,000	3 6 0	0 4 6		0 3 4	
7	2,001 to 10,000 in multiples of 1,000	5 1 0	0 3 4		0 3 1	
		to 4 10 0	to 0 2 0		to 0 1 6	
8	Above 10,000	9/32 pie per watt of connected load	0 2 0		0 1 6	

Subject to a maximum total charge of 6 annas 8 pies per unit (gross rate) and 5 annas per unit (net rate).

APPENDIX XI

(Sheet No. 2)

(Referred to in paragraph 48 of the Report)

TARIFFS FOR UHL RIVER HYDRO-ELECTRIC SCHEME AS ON 1st JUNE 1953

Schedule of Tariffs for Industrial Supply

TWO—PART TARIFF

Rate No.	Connected Load or Maximum Demand in kilowatts	FOR NORMAL PRESSURE OF UP TO 400 VOLTS		FOR NORMAL PRESSURE OF UP TO 11,000 VOLTS		Maximum Total Charge per unit
		Demand Charge	Energy Charge	Demand Charge	Energy Charge	
		Rs per month per kW of connected load or maximum demand	Pies per unit	Rs per month per kW of connected load or maximum demand	Pies per unit	
1	2	3	4	5	6	7
		Rs A. P.	Pies	Rs A. P.	Pies	Pies
1	Less than 4	8 3 0	11	..	..	18
2	4—10	7 0 0	10	..	..	16
3	11—30	6 13 0	9½	..	..	15
4	31—70	6 6 0	8	..	..	14
5	71—130	6 0 0	7½	5 12 0	7½	13
6	131—230	5 4 0	7½	5 0 0	7½	12
7	231—500	4 12 0	6½	4 8 0	6½	10
8	501—1,000	4 8 0	5½	4 4 0	5½	10
9	Above 1,000	Rates to be decided by mutual agreement.				

APPENDIX XI

(Sheet No. 3)

(Referred to in paragraph 48 of the Report)

TARIFFS FOR UHL RIVER HYDRO-ELECTRIC SCHEME AS ON 1st JUNE 1953

Schedule of Tariffs for Bulk Supply

TWO—PART TARIFFS

Rate No.	Maximum Demand or connected load kW at each point of supply	FOR NORMAL PRESSURE OF UP TO 400 VOLTS		FOR NORMAL PRESSURE OF UP TO 11,000 VOLTS		Maximum Total Charge per unit
		Rs/month per kW of maximum demand or connected load	Pies per unit	Rs/month per kW of maximum demand or connected load	Pies per unit	
1	2	3	4	5	6	7
		Rs A. P.	Pies	Rs A. P.	Pies	Pies
1	Up to 100 ..	11 0 0	8·5	10 11 0	8·5	23·5
2	101—200 ..	9 9 0	8·0	9 4 0	8·0	20·25
3	201—500 ..	8 12 0	7·5	8 7 0	7·5	19
4	501—1,000 ..	7 14 0	7·0	7 10 0	7·0	17
5	1,001—2,000	6 12 0	6·75	6 8 0	6·75	16
6	Above 2,000 ..	Rates to be decided by mutual agreement.				

APPENDIX XI

(Sheet No. 4)

(Referred to in paragraph 48 of the Report)

TARIFFS FOR THE UHL RIVER HYDRO-ELECTRIC SCHEME AS ON 1st JUNE 1953

Schedule of Tariffs for Special Bulk Supply

Alternating current, 3-phase at normal frequency of 50 cycles per second at a pressure of 11,000 volts
Tariff 'S'
(Stepped Rate)

Rate No.	Consumption per month (Units)	Rate of Charge per Unit			
1	Up to 5,000 ..	16·5	} Plus 12½ per cent with 1st effect April 1951		
2	5,001—10,000 ..	15·5			
3	10,001—15,000 ..	14·25			
4	15,001—20,000 ..	13·5			
5	20,001—25,000 ..	12·75			
6	25,001—30,000 ..	12			
7	30,001—35,000 ..	11·5			
8	35,001—40,000 ..	11			
9	40,001—50,000 ..	10·5			
10	50,001—100,000 ..	10·25			
11	100,001—200,000 ..	10			
12	200,001—300,000 ..	9·75			
13	300,001—500,000 ..	9·5			
14	500,001—750,000 ..	9			
15	750,001—1,000,000 ..	8·75			
16	1,000,001—1,250,000 ..	8·6			
17	Above 1,250,000 ..	8·25			

APPENDIX XI

(Sheet No. 5)

(Referred to in paragraph 48 of the Report)

TARIFFS FOR UHL RIVER HYDRO-ELECTRIC SCHEME AS ON 1st JUNE 1953

Schedule of Tariffs for Street Lighting

THREE—PART TARIFF

Rate No. 1—Line Charge	.. Rs 12 (Twelve) per month per mile of line used for Public Lighting
Rate No. 2—Lamp and fixture charges—	
(a) for lamps of 25 to 50 watts	.. Annas 10 per lamp per month
(b) for lamps of 61 to 100 watts	.. Annas 12 per lamp per month
(c) for lamps of 101 to 150 watts	.. Rs 1-2-0 per lamp per month
(d) for lamps of above 150 watts	.. Special Quotations
Rate No. 3—Energy Charge	.. Annas 2 per unit

APPENDIX XI

(Sheet No. 6)

(Referred to in paragraph 48 of the Report)

TARIFFS FOR UHL RIVER HYDRO-ELECTRIC SCHEME AS ON 1st JUNE 1953

All Electric Home Tariff (" AEH " Tariff)

Rate No.	Load group excluding heating load (watts)	Consumption to be charged at Rate " A " viz., present two-part General Supply Tariff (units)	Rate ' B ' to be applied to the consumption over and above the units charged at Rate ' A ' (Pies)
1	2	3	4
1	50 and under	5	24
2	51—100	8	24
3	101—200	12	24
4	201—500	18	24
5	501—1,000	24	21
6	1,001—2,000	32	18
7	2,001—3,000	40	18
8	3,001—4,000	50	18
9	4,001—5,000	60	18
10	5,001—6,000	75	15
11	6,001—7,000	90	15
12	7,001—8,000	105	15
13	8,001—9,000	120	12
14	9,001—10,000	135	12
15	Above 10,000	150	12

Notes. If the bill be not paid " Due Date " 12½ per cent extra shall be levied on the amount calculated at Rate ' B ' in addition to penalty for late payment in respect of consumption chargeable at Rate ' A '.

(a) The tariff shall not be applicable to Cinemas and other big institutions and Establishments which will be governed by the General Supply and/or Industrial Supply Tariff as hereofore.

APPENDIX XII
(Referred to in paragraph 49 of the Report)

Commercial Data of the Uhl River Hydro-Electric Scheme for the years 1950-51, 1951-52 and 1952-53

Serial No.	Class of Supply	CONNECTED LOAD (kW)			AVERAGE MAXIMUM DEMAND (kW)			KWh Sold (In Millions)			REVENUE (In Lacs of Rupees)		
		1950-51	1951-52	1952-53	1950-51	1951-52	1952-53	1950-51	1951-52	1952-53	1950-51	1951-52	1952-53
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	General	10,227	14,620	17,295	1,000	1,500	1,700	7.17	10.72	12.70	14.75	22.08	28.36
2	Industrial	30,245	40,318	44,814	15,000	20,000	22,000	26.86	33.73	42.70	19.49	24.62	30.98
3	Street Lighting	152	199	314	152	199	314	0.45	0.53	0.61	0.58	0.71	1.14
4	Bulk	8,187	6,680	8,551	4,000	3,300	4,000	33.79	34.66	36.21	17.32	18.73	21.48
5	Pakistan	9,000	9,000	5,000	9,000	9,000	5,000	71.10	72.16	35.01	42.27	51.52	24.66
6	Total	57,841	70,817	73,974	23,152 (30,200)	33,999 (34,400)	33,014 (33,200)	139.37	151.80	127.23	94.41	117.66	106.62
7	Miscellaneous Receipts	..	..	..	..	..	..	..	..	..	2.83	5.23	6.08
	Total Gross Revenue	..	..	..	..	..	..	..	..	..	97.24	122.89	112.70

Note. Figures in brackets in Columns 6, 7 and 8 denote actual Maximum Demand for the respective years.

BHAKRA-NANGAL POWER PROJECT

Revenue Forecast of the Uhl River Hydro-Electric Scheme for the years 1954-55 to 1973-74

APPENDIX XIII
(Referred to in paragraph 49 of the Report)

Year of Operation of Nangal Project	Year	MAXIMUM DEMAND						(kW) AND CONSUMPTION (kWh)				GROSS REVENUE (IN LACS OF RUPEES)			
		Punjab (India)			Pakistan			Total		Punjab (India)		Pakistan	Total		
		Local Distribution		Bhakra-Nangal	M.D.(kW)	kWh (in millions)	M.D.(kW)	kWh (in millions)	Local distri- bution	Bhakra- Nangal					
		M.D.(kW)	kWh (in millions)								M.D.(kW)			kWh (in millions)	
I	2	3	4	5	6	7	8	9	10	11	12	13	14		
1st ..	1954-55	10,400	41.61	17,800	38.98	4,800	35.04	33,000	15.63	34.01	16.50	24.64	75.15		
2nd ..	1955-56	10,900	43.80	17,300	75.87	4,800	35.04	33,000	155.71	37.96	32.07	24.64	92.59		
3rd ..	1956-57	11,600	46.43	16,600	74.24	4,800	35.04	33,000	155.71	37.96	30.59	24.64	93.59		
4th ..	1957-58	12,300	49.06	15,900	71.18	4,800	35.04	33,000	155.28	40.11	29.73	24.64	94.48		
5th ..	1958-59	13,000	53.00	15,200	68.11	4,800	35.04	33,000	156.15	43.27	28.47	24.64	96.38		
6th ..	1959-60	14,000	56.06	14,200	64.39	4,800	35.04	33,000	155.49	45.83	26.94	24.64	97.41		
7th ..	1960-61	14,700	58.69	13,500	60.66	4,800	35.04	33,000	154.39	48.26	25.41	24.64	98.31		
8th ..	1961-62	15,200	60.44	13,000	58.04	4,800	35.04	33,000	153.52	49.41	24.33	24.64	98.38		
9th ..	1962-63	15,600	62.20	12,600	56.06	4,800	35.04	33,000	153.30	50.85	23.52	24.64	99.01		
10th ..	1963-64	16,200	64.39	12,000	53.87	4,800	35.04	33,000	153.30	52.64	22.62	24.64	99.50		
11th ..	1964-65	16,400	65.26	11,800	52.12	4,800	35.04	33,000	152.42	55.22	21.90	24.64	101.76		
12th ..	1965-66	17,100	67.45	11,100	50.15	4,800	35.04	33,000	152.64	57.01	21.09	24.64	102.74		
13th ..	1966-67	17,300	69.20	10,900	43.18	4,800	35.04	33,000	152.42	58.16	20.28	24.64	103.08		
14th ..	1967-68	17,700	70.96	10,500	46.87	4,800	35.04	33,000	152.87	59.31	19.74	24.64	103.69		
15th ..	1968-69	18,200	72.71	10,000	44.90	4,800	35.04	33,000	152.65	60.46	18.93	24.64	104.03		
16th ..	1969-70	18,600	74.46	9,600	42.92	4,800	35.04	33,000	152.42	61.61	18.12	24.64	104.37		
17th ..	1970-71	19,000	76.21	9,200	41.17	4,800	35.04	33,000	152.42	62.76	17.40	24.64	104.80		
18th ..	1971-72	19,500	77.96	8,700	39.20	4,800	35.04	33,000	152.20	63.91	16.59	24.64	105.14		
19th ..	1972-73	20,000	79.72	8,200	37.01	4,800	35.04	33,000	151.77	65.06	15.69	24.64	105.31		
20th ..	1973-74	20,400	81.47	7,800	35.04	4,800	35.04	33,000	151.52	66.21	14.88	24.64	105.73		

BHAKRA-NANGAL AND UHL RIVER SYSTEMS

**Financial Returns
(In Lacs of Rupees)**

**APPENDIX XV
(Referred to in paragraph 49 of the Report)**

Year of operation	UHL RIVER PROJECT						BHAKRA-NANGAL PROJECT					
	Year	2	3	4	5	6	Percentage Return	Capital outlay to the end of the year	Total sum at end of the year	Net Revenue during the year	Percentage Return	Capital outlay to the end of the year
1st	1954-55	..	..	..	..	..	..	..	..	..	..	..
2nd	1955-56	..	..	..	..	..	..	..	..	..	..	..
3rd	1956-57	..	..	..	..	..	..	..	..	..	..	..
4th	1957-58	..	..	..	..	..	..	..	..	..	..	..
5th	1958-59	..	..	..	..	..	..	..	..	..	..	..
6th	1959-60	..	..	..	..	..	..	..	..	..	..	..
7th	1960-61	..	..	..	..	..	..	..	..	..	..	..
8th	1961-62	..	..	..	..	..	..	..	..	..	..	..
9th	1962-63	..	..	..	..	..	..	..	..	..	..	..
10th	1963-64	..	..	..	..	..	..	..	..	..	..	..
11th	1964-65	..	..	..	..	..	..	..	..	..	..	..
12th	1965-66	..	..	..	..	..	..	..	..	..	..	..
13th	1966-67	..	..	..	..	..	..	..	..	..	..	..
14th	1967-68	..	..	..	..	..	..	..	..	..	..	..
15th	1968-69
16th	1969-70
17th	1970-71
18th	1971-72
19th	1972-73
20th	1973-74

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